INDIA RUBBER WORLD
FOUNDED 1889
CAOUTCHOUC GUTTA-PERCHA

Reg. United States Pat. Off. Reg. United Kingdom.

Published on the 1st of each month by

THE INDIA RUBBER PUBLISHING CO
No. 25 West 45th Street, New York.
Telephone—Bryant 2576.
CABLE ADDRESS: IRWORLD, NEW YORK.

HENRY C. PEARSON, F.R.G.S., Editor

Vol. 61. JANUARY 1, 1920. No. 4.

SUBSCRIPTION: $3.00 per year, $1.75 for six months, postpaid, for the United States and dependencies and Mexico. To the Dominion of Canada and all other countries, $3.50 (or equivalent funds) per year, postpaid.

ADVERTISING: Rates will be made known on application.

REMITTANCES: Should always be made by bank draft. Post Office or Express money order on New York, payable to THE INDIA RUBBER PUBLISHING COMPANY. Remittances for foreign subscriptions should be sent by International Postal Order, payable as above.

DISCONTINUANCES: Yearly orders for subscriptions and advertising are regarded as permanent, and after the first twelve months they will be discontinued only at the request of the subscriber or advertiser. Bills are rendered promptly at the beginning of each period, and thereby our patrons have due notice of continuance.

New Year's Greetings!

A HAPPY NEW YEAR and a prosperous one! May all of our friends here and abroad have the good luck to wish wisely and their wishes be realized. Thus the rich promise of this new year, to our industry and to the world, will be fulfilled.

THE INDUSTRIAL RELATIONS COMMITTEE.

IT IS NO EXAGGERATION to state that as a whole, rubber workers are better paid, housed and looked after than laborers of any other great industry. This has been done wholly through the initiative of individual companies. This will continue without a doubt, but it is to be aided and strengthened by collective effort. This is forecast by the formation of an Industrial Relations Committee consisting of twenty-five firm members of The Rubber Association of America. The getting together of the great manufacturers for the purpose of exchanging views should be of the greatest benefit to employer and employe.

AMERICAN RUBBER PLANTATIONS IN MEXICO.

NOT LONG AGO there were 150 rubber plantations in Mexico, some of them very important undertakings. They were owned by American companies with headquarters in every important city from New York to San Francisco and from St. Louis to Chicago. They owned hundreds of thousands of acres of land, buildings, machinery—the best of equipment. They had cleared and planted great areas to rubber, coffee, cane and foodstuffs. They employed large forces of natives whom they housed, fed and paid well.

To-day, that whole industry has been destroyed, the buildings looted and burned, the plantations given over to the jungle, the laborers scattered. Furthermore the American superintendents and foremen, such as were not slain, have been driven from the country. And so far there seems to be no redress.

LABOR FAMINE NOT TO BE FEARED.

FROM MANY WELL-INFORMED SOURCES evidence is accumulating that manufacturers, business men, bankers and others fear a labor shortage. The era of spending that reached its climax during the Christmas holidays indicated a feeling on the part of laboring men that money is very plenty, that big wages are to continue, and their jobs secure.

The American Bankers' Association affirms that an alarming proportion of our 14,000,000 foreign born are drawing money from the banks, selling Liberty Bonds and houses and are preparing to return to Europe. The estimate made is that $4,000,000,000 will be carried away by the 1,500,000 workers who are leaving for home, just when the call for workers here is most acute. It is said that in one plant employing 12,000 foreign born men, 45 per cent have signified their intention of leaving this country and the superintendent declares that should even 15 per cent leave, he would not know how to replace them.

There is this to be remembered, however. We faced the severest sort of labor famine during the war that could be imagined, and most of the factories ran. There is to-day a new force of workers in the thousands of women who found congenial and remunerative work in many industries. The United States is also better prepared to create automatic and labor saving machinery than is any country in the world.

There is also the probability of employing the plentiful and cheap labor supply of the Orient. Consider the

Chinese labor supply for instance. Already certain European publishers of books, because of the high cost of printing and binding are having their work done in China and done well and cheaply. This, of course, is because of the abundance of cheap labor. Now that there is talk and perhaps danger of a labor famine in the United States, and because of the extremely high labor wage here, will not American manufacturers look Chinaward? We are barred by law, passed in the interest of American labor, from bringing the Chinese worker here. There is no law, however, forbidding one to take the work to him. That is why American mills, perhaps rubber mills, may ere long be operated in the Flowery Kingdom. Incidentally China is very near the vast crude rubber supply of the Malay States and the Dutch Indies.

PLANTING HEVEA IN THE PHILIPPINES.

WORK is going on, steadily but slowly, in the direction of planting new rubber areas in the Philippine Islands, particularly in Mindanao, where large tracts have been cleared in the last 20 months to be planted to *Hevea*. This is chiefly the work of Dr. J. W. Strong, representing American capitalists.

There is a wonderful field for rubber plantations in the southern islands and the Department of the Interior in the Philippines would do well to discover why American capital does not come in more rapidly. If it is the fault of existing laws, surely the Filipinios will have them corrected.

"TECH'S" NEW INDUSTRIAL PLAN.

A PLAN which has been adopted by the Massachusetts Institute of Technology is destined to be of great advantage to manufacturers in general if it touches the popular key-note which is intended. In brief, it is to place at the disposal of the various industries of the country all the resources of the great Boston institution, its magnificent library, its consultant staff, experience and general knowledge, upon the payment of a certain annual fee. The advantage to industry is comprehended in the opportunity of obtaining the most skilled advice and experience in the world in solving the various technical problems which constantly arise, many of which are beyond the ken of the average consultant. The idea was advanced in connection with the appeal for the raising of funds which has been recently made. The Institute would virtually be retained by the various industries which subscribe to the plan exactly as though it were a private firm of consulting chemical engineers.

AN AMERICAN RUBBER RESERVE.

A YEAR or more ago it was seriously proposed that a reserve of crude rubber be created in the United States. It was to be held against failure of overseas crops, embargoes, or prohibitive prices. If we remember rightly, 100,000,000 pounds was deemed an amount that would be sufficient for the purpose. Of course there was the financial handicap of interest upon the investment, insurance, and deterioration, to be met and overcome, but those were mere details.

According to a report just issued by the University of California, summarized elsewhere, an even greater reserve is already established. The report, the work of Professor Harvey Monroe Hall and his colleague, Thomas Harper Goodspeeed, relates to the existence of millions of pounds of "Chrysil rubber" in our western states, a supply of notable value if the present sources fail or if prices go to the $3-mark again. Three hundred million pounds of crude rubber, which is the estimate all ready for extraction, would easily tide us over a year, in which time we could doubtless get overseas rubber again.

LOOKING AHEAD IN RUBBER.

PLANNING for the future of the rubber industry is something that manufacturers, engineers and skilled chemists are constantly doing. In the laboratories of the great rubber manufactories are men who think in rubber for years ahead. They foresee an ever increasing production of crude rubber which will make possible the fabrication of articles now undreamed of. It will after all be but history repeating itself.

The rubber fiber shoe soles came suddenly, but it was thought out long in advance of its début. Rubber chemists and manufacturers waited for low rubber and high leather. The market was finally ready for the fiber sole, as it will be one day for other new and revolutionary rubber products.

HEAVY SERVICE TIRES.

A BRANCH of automobile tire production which is destined to increase notably in the next year or two is the manufacture of heavy tires, particularly pneumatic, for use on what is known as "freight car trucks."

Where in the past the railroad did most of the "short haul" business, to-day the truck is taking it over quietly and efficiently. As fast as usable roads are built the truck does the freighting. Motor trucks are already widely used in transporting freight from town to town and from farmer to market, and it is to the interest of all shippers to promote this method of transportation as much as possible. The motor truck solved the freight congestion problem of the railroads during the winter months of 1917 and 1918 and they are already being called upon on a much larger scale for the coming winter.

Once motor roads parallel railroads, a general railroad strike would be an impossibility, for automobiles would care for the passengers, and trucks the freight. The tire manufacturers are helping toward such preparedness to a notable degree.

Three Hundred Million Pounds of Chrysil Rubber.

THE LONG LOOKED FOR REPORT upon rubber-bearing shrubs in western America has appeared and it is no exaggeration to say that it is one of the most complete, scholarly and practical treatises of the day. It is mainly the work of Professors Harvey Monroe Hall and Thomas Harper Goodspeed of the University of California and is entitled "A Rubber Plant Survey of Western North America," preceded by a twelve-page reprint on ecology from the year book of the Carnegie Institution for 1918.

This covers study and experiment at desert and mountain stations and through expeditions. The specific work on rubber began in 1917 when a chemical laboratory was fitted up at the Alpine Laboratory at Pike's Peak to work in conjunction with a desert laboratory and the university laboratory at Berkeley, California. Here 18 genera and 30 species were examined chemically. These were largely latex plants. Rubber was found in 25 of the species examined, but in most it was too minute in quantity to be important. In 11 the percentage was enough to call for further work and in 4 it was high enough to warrant the hope that the species may serve for the production of rubber on a commercial scale.

VIEW OF BENTON HILLS, CALIFORNIA, WHERE ONE OF THE EXPERIMENTAL TRACTS OF CHRYSOTHAMNUS WAS LOCATED. HAPLOPAPPUS WAS ALSO FOUND AMONG THE ROCKS MIDWAY UP THE HILLS.

The main report apart from the folder on ecology is divided into three parts:

(1.) The *Chrysothamnus nauseosus*, by Professor Hall.

(2.) Chrysil, a new rubber from *Chrysothamnus nauseosus*, by Professors Hall and Goodspeed.

(3.) The occurrence of rubber in certain West-American shrubs, by Professors Hall and Goodspeed.

In the first part, Professor Hall, after a brief general description of the *Chrysothamnus*, presents a key to the sections of *Chrysothamnus* which he assembles in five natural groups. Of these the *C. nauseosus* is the one he selects as containing rubber in sufficient quantity to be interesting. Next comes a key to the varieties of *C. nauseosus*, followed by a synopsis of the varieties. This latter is a complete botanical description of 22 varieties, with extended notes covering occurrence, habitat, etc. This part closes with a very valuable index of specific and varietal names. Part 2, relating to the product of the *C. nauseosus*, which is well named Chrysil rubber, will appeal to the rubber manufacturer, just as Part 1 appeals to the botanist.

Very wisely, at the beginning, 25 pounds of the shrub was sent to Dr. David Spence to get an idea of the value of the rubber. His report was that the rubber was of "high grade and average quality, not as good as the best fine Pará, but a great deal better than most Africans or low grade rubbers."

The *Chrysothamnus*, or "rabbit brush," is very widely distributed. The investigators found that "they range in altitude from about sea level in some of the desert basins to 8,000 feet in the southern Colorado mountains. Some varieties occur at even higher altitudes, but they have not been examined as to their rubber content. The plants are most abundant and of maximum size in the Great Basin area, becoming more and more scattered and apparently diminishing in their percentage of rubber as we pass from this center of distribution. The most northerly points from which we have taken samples for analysis are in eastern Oregon (Redmond, Burns, etc.), eastern Washington (Spokane), southern Idaho, and southern Wyoming (Rawlins, Laramie). The best samples carried only three per cent of rubber and most of them ran less than two per cent. The easterly limits of the genus are reached in South Dakota and western Nebraska; the southerly limits, in western Texas, southern New Mexico, and southern Arizona, with some possible extensions into Mexico, or at least into Lower California. On the Pacific Coast we find scattered groups of the plants as far west as the Coast Range mountains; for example, San Benito County, Mt. Hamilton, Lake County, Trinity County, etc."

A very interesting estimate of what may be expected as to extracted product is as follows:

Districts.	Pounds.
No. 1—East Central California and adjacent Nevada	3,280,000
No. 2—Mojave desert, California	400,000
No. 3—Northeastern California and adjacent Nevada and Oregon	1,000,000
No. 4—West Central Nevada	7,680,000
No. 5—Northern and Central Nevada	23,700,000
No. 6—Utah	20,000,000
No. 7—Colorado	24,300,000

In addition to this there are numerous other extensive and unexplored regions where large amounts of rubber-bearing shrubs can be found. The most promising of these is Wyoming, and there are also considerable areas in southern Montana, in Idaho and in eastern Washington. This total of approximately 80,000,000 pounds can be increased by 50 per cent by allowing for other districts in these regions which were not explored, and that with the other regions mentioned would bring the total well up to 300,000,000 pounds.

It should be noted by the way that the *Chrysothamnus* is not a latex producing plant. The rubber is found in the individual cells of the shrub, as in guayule. Like guayule also it is found principally in the parenchymatous elements of the cortex. It may also be noted that rubber does not appear to be laid down during the first year of growth of a tissue, and, indeed, unless present in large amount, is not readily detected by the histological method in portions of the plant less than three or four years old.

Shrubs of interest as possible rubber producers are usually of good size, measuring three to eight feet high and about as broad. The rubber is present for the most part in the inner bark of the stems, and those portions in average mature plants will weigh from five to fifteen pounds. An exceptionally large plant found near Lone Pine, California, weighed 60 pounds exclusive of the twigs, and shrubs weighing 20 to 40 pounds are not rare. This is partly because the plants reach the maximum size only under favorable conditions and partly because they are frequently burned or cut off near the base, after which new stems shoot up only to be again destroyed before reaching maturity.

Another shrub that is treated at length is the *Haplopappus*, which contains considerable more rubber than the *Chrysothamnus*, from 6 to 10 per cent. The product is, however, soft and resinous.

A brief, even of the briefest, of the many lines of investigation, the chemical analyses and the microscopical examinations, is out of the question here, so comprehensive is the work.

In conclusion it is to be hoped that the work will be carried farther and that the cultural possibilities of these interesting shrubs will be fully investigated and at an early date.

PEACE PROBLEMS AND PROGRESS.

INTERNATIONAL TRADE CONFERENCE.

THE International Trade Conference held in October at Atlantic City, New Jersey, and the subsequent tour of the foreign delegates to the principal industrial centers of the United States has accomplished much toward the desired restoration of world commerce, and it is believed that a program may now be framed which will help Europe to regain her feet commercially and industrially.

America now knows the needs of her allies in raw materials, food and machinery, and the action taken at Atlantic City indicates that their needs will be met. America also appreciates more fully that American prosperity is bound up in European prosperity, for Europe cannot pay even the interest on the debt she owes us unless she can be restored to production. The whole matter resolves itself into a business proposition of enormous proportions to be handled in a business way, with credit as the base.

A permanent organization was formed to make effective the purpose of the conference. An international meeting will be held in 1920, after which the gatherings will be biennial. Approval was given to the Edge Bill, recently passed, authorizing financial assistance in Europe, and also to effective investments in foreign credits against which debentures of American companies may be issued.

England asks only for an opportunity to purchase in America certain commodities for which she can pay. Belgium, which is recovering rapidly from the war, asks for credit to enable her to buy here. France and Italy have the most pressing needs, and their request is for long time loans.

GOODRICH TRAVEL AND TRANSPORT BUREAU.

Prompted by a growing demand for highway information and charts from highway transportation engineers and advocates, the National Touring Bureau of The B. F. Goodrich Rubber Co. announces that its scope of operation will be broadened to include the dissemination and distribution of all highway transport data.

Henceforth it will be known as the Goodrich Travel and Transport Bureau. Through its country-wide organization of branches, depots and dealers the bureau has distributed upwards of 150,000,000 pieces of touring information to the motoring public. During 1919 it distributed nearly 5,000,000 state highway maps.

Raymond Beck, who acted as field engineer of the United States Highways Transport Committee during the war, has been chief of the bureau since its inception in 1911.

A campaign has been inaugurated by the bureau to make American highways 100 per cent efficient by keeping them open this winter.

A booklet has been prepared on the subject that will be distributed to state and county highway engineers and commissioners. It shows that the snow problem can be solved in two ways or by a combination of both, consisting of drift prevention measures and snow removal methods.

TIRE BUSINESS TO EXCEED A BILLION DOLLARS IN 1920.

G. W. Yeoman, treasurer of the Continental Motors Corp., Detroit, Michigan, and a director of the Motor and Accessory Manufacturers' Association believes it is likely that the production of passenger automobiles for 1920 will be near the 2,000,000 mark, while the output of commercial motor vehicles will be about 300,000. He also asserts that there will be nearly 8,000,000 power driven vehicles, including both passenger and commercial cars, in actual use by the dawn of the new year.

This estimate approximately coincides with the deductions of others in a position to know, and from it the probable tire demand for the year can be readily computed.

With 8,000,000 motor cars in operation, some 40,000,000 tires will be in use and will be required annually. To these must be added 8,000,000 tires required for the original equipment of 2,000,000 new cars and 2,000,000 more which will be needed for spares within the year. The 300,000 new trucks will require 1,200,000 tires for original equipment and 300,000 more for spares. All told it appears that the 1920 tire demand may reach 51,500,000 tires valued at some $1,287,500,000.

Making Arctics by Machinery.

AFTER SEVERAL YEARS of experimenting a process of making cloth arctics by machinery after the manner of manufacturing leather shoes, has been perfected. The advantages of the machine over the hand method are a lower production cost per pair, sturdier and more nearly standard shoes, less waste and greater output, all of which have been so satisfactorily demonstrated that rubber shoe factories are beginning to change over to the machine method.

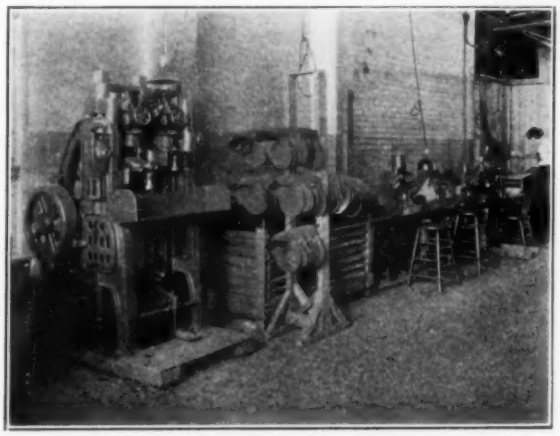
In order that the difference between hand and machine manufacture may be clearly brought out, the time-honored hand system is briefly described.

THE HAND METHOD.

A prevailing type of one-buckle arctic consists of twenty parts: the insole, rag sole, filler, outsole, heel lift, lining (usually of wool or fleece) joining strip or piping, toe cap, rag heel, cloth heel, foxing, gum inner vamp, friction inner vamp, quarter and vamp facing, heel strip, back stay, quarter stay, cord buckle strap and buckles. A team of three men is the usual complement for making this shoe although individual makers frequently construct the arctic from start to finish.

All of the inside pieces, such as the insole, rag sole, etc., are coated with cement, the wool linings are joined at the seams with ¼-inch piping, the quarter is edged with cord and the buckles put on by girls in the make-ready department or stock cage for the team workers; individual makers prepare their own work.

At the start of the operation the first maker "lasts over" the lining to the insole, applies the heel lift, friction toe foxing, rag filler and gum inner vamp. The shoe then passes to maker number two, who completes the construction of the upper by



PREPARING THE UPPER AND MOLDING THE OUTSOLE.

Right to left: The girl is rolling the foxing on the assembled upper. Machines on the bench are Singer sewing machine, cementing machine for the edges of the upper, "stitcher" for the foxing, and a second cementing machine. On the rack are assembled tops ready for lasting. Machine at the left is for molding the insole to the shape of the last.

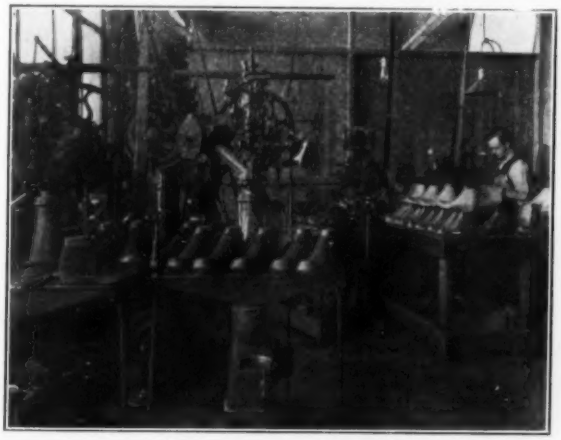
putting on the rag heel, cloth heel, and the facings, which are applied separately, it will be noted, and joined at the sides.

Maker number three finishes the shoe by "stitching" (a term used for running a serrated roller around the edges of the foxing and outsole to bind them together) the foxing, putting on the gum toe cap, and rolling on the outsole. After the shoes are vulcanized, they are stripped from the lasts in the packing room and the surplus lining trimmed off.

THE MACHINE METHOD.

The first difference in the machine method which has been developed by the United Shoe Machinery Co. is that the upper instead of being built on the last, piece by piece, is made up complete before lasting, the same as the upper of a leather or tennis shoe. Thus the top is completely fitted to the last.

The construction of the upper is similar except that the linings follow the same lines as the facings and are made to fit exactly, thus avoiding the waste of trimming after vulcanization. The gum foxings are placed on the upper before lasting as follows: the heel foxing is placed on the quarter and rolled by machine; the quarter is then stitched to the vamp on a Singer sewing machine, after which the toe foxing is applied so



ASSEMBLING AND LASTING.

Right to left: The man is tacking the insole to the last. Next is the machine which assembles the upper and insole at the heel. Directly in front are two consolidated hand lasting machines or "niggerheads" which nail the upper to the insole. In the rear is a "pulling over" machine, which lasts over the forepart of the upper. Shoes in the foreground are lasted and ready for the "pounder."

that it overlaps the heel foxing at the sides. The edges of the top are cemented by machine in one operation, and it is ready for lasting.

An insole of fiber board or composition material is generally used, although the ordinary sole of "rag" and cloth answers the purpose, provided the rag is compounded with plenty of fibrous material to make it stiff. A rag filler smaller than the insole is cemented to it by an insole cementing machine and molded to the shape of the last on a molding machine similar to that used to mold outsoles of leather shoes.

Wooden lasts bottomed with a sheet of metal perforated with holes at the ball, shank and heel are used, but any style of wooden or metal last can be adapted to the method. A tacking machine fastens the insole to the last by inserting a tack in each of the three holes for temporary purposes. The insole and the upper are then assembled on an assembling machine, which tacks the upper to the last at a point just above the heel foxing and lasts over the heel. Thus the upper is held firmly in place on the last, and the large lining of the hand-made arctic becomes unnecessary. The small tack hole just above the foxing in no way impairs the waterproof qualities of the shoe, as it closes during vulcanization.

The shoe then passes to the "pulling over" machine, which pulls or lasts over the upper at the forepart after which the hand-method lasting machine or "niggerhead" fastens the upper securely to the insole by inserting a line of tacks about ¼-inch from the edge. The upper has previously been cementd along the edge, so the machine arctic is both nailed and cemented. The thickness of the upper corresponds to the gage of the filler, consequently the bottom of the shoe is smooth. Even the most experienced hand lasters cannot always avoid the bunches and

lumps at the toe and heel. A machine known as a "pounder" finishes off the bottom, buffing away the rough edges and removing the three tacks which hold the insole to the last. A different type of cementing machine cements the bottom, and the shoes are dried on racks before the outsole is applied.

The outsole is put on by a recently invented sole-laying machine. By working a foot lever a cushion consisting of layers of vulcanized rubber presses the sole on the shoe after the manner of a vise. The cushion of rubber applies uniform, direct pressure to the entire surface of the sole and envelopes it so that it can be used for rolled and semi-rolled edge outsoles. A machine "stitcher" finishes off the job, and the shoe is ready to be vulcanized.

Manufacturers have found that the yield of "seconds" from machine-made arctics is much lower than from the hand-made product. Uniform pressure of machine rolling on the foxings and outsole is responsible for this, as blistering owing to light rolling has been eliminated. The two, four and six-buckle arctics involve no new problems of manufacture, the only difference being in the construction of the upper. The same lasts are used with an ankle piece fastened on.

LAYING THE OUTSOLE.

The man is applying the outsole on a sole laying machine. At the right is the machine for cementing the insole. Shoes on the rack are ready to be outsoled.

This is the first process in the history of the rubber shoe business by which arctics have been made by machinery. It will be interesting to watch further developments in this field, for the introduction of machinery will undoubtedly make for standardization and increased production in rubber shoes of all varieties.

NUMBER OF EMPLOYES, TOTAL PRODUCTION AND CRUDE RUBBER CONSUMED IN THE RUBBER INDUSTRY 1917-1918.

The request of The Rubber Association of America for information was answered this year by only 103 out of 452 manufacturers, but these represented 73 per cent of the rubber output in 1917; the same percentage is therefore employed in estimating the totals for 1918. The number of employes reported by the minority was 151,078 in 1917 and 148,787 in 1918 a diminution of 3,896 or 1.88 per cent. Applying this percentage to the total number reported in 1917 gives 203,818 as the total number of employes in 1918.

The 103 manufacturers sold $819,159,105 worth of goods as compared with $654,948,376 in 1917, an increase of 26.4 per cent. Applying the same method to the computation of the total sales we obtain $1,122,135,760 as the estimate for 1918 compared with the $895,816,248 reported for 1917. It may be noted that the product of the 103 in 1918 is very nearly equal to the total product of 1917.

The total amount of crude rubber used in 1918, 322,606,605 pounds, was only a little over 5 per cent more than the 306,113,652 pounds consumed in 1917. About an eighth less rubber was used for casings under 6 inches, 140,021,023 pounds instead of 162,643,482 pounds in 1917, while the quantity put into solid tires doubled, 50,024,166 pounds instead of 25,055,673 pounds in 1917, while that employed for other tires and tire sundries increased by two-fifths, 14,221,023 pounds as compared with 9,983,195.

While the total amount of rubber used for tires increased slightly, 237,168,347 pounds in 1918 and 233,386,796 pounds in 1917, the quantity used for other rubber goods was greater relatively, so that the proportion of rubber for tires was a shade under three-fourths of the total in 1918 instead of a little above as in 1917. The increase in boots and shoes was about a sixth, 31,468,843 pounds; that in mechanical goods very slight, 22,101,528 pounds and that in other products almost a third, 31,897,887 pounds.

BRITISH COTTON TRADE DEALS.

With regard to the recent cotton trade deals, it is of interest to note the connection of some of the moving spirits with the rubber industry. It is well known that the Dunlop Rubber Co., Limited, has its own spinning and weaving mills in Lancashire, so it is not altogether surprising that it is closely concerned with the Amalgamated Cotton Trust which was formed in October, 1918, to acquire certain mills. The first report of this company, issued in November, showed a profit of £114,416. This trust owns twenty mills and is linked up through one or another of its directors with the Dunlop Rubber Co., Limited, the Tyre Investment Trust and the Austin Motor Co.

A. L. Ormrod, who is on the board's financial advisory committee, is chairman of the Dunlop Rubber Co., Limited, and W. T. Glover & Co., Limited, and a director of the Tyre Investment Trust, while Wilfrid Dawson, also on the committee, is a director of the Dunlop company and of the Tyre Investment Trust. Harvey du Cros, a director of the Amalgamated Cotton Trust, is director of the Austin Motor Co., while another director, S. W. Copley, is the owner of a small rubber works among his various other and more important interests. That South African mining and finance are in the cotton mill transfer is seen by the names of A. R. Stephenson, manager of Barnato Brothers, and S. B. Joel.

It is obvious that the sellers of the concern recognize that increased capital is necessary in order to finance the business at the present high price of materials and that building extension will cost far more in the future than in the past.

REACTIONS OF ACCELERATORS DURING VULCANIZATION.[1]

By C. W. Bedford and Winfield Scott.

THE HIGHEST POWERED ORGANIC ACCELERATORS known to-day are the carbon bisulphide reaction products of strong organic bases. Perhaps the best example is the piperidine salt of piperidyl-dithiocarbamic acid.

Due to the strong basic nature of piperidine, this salt is stable and may be isolated as such. Strong aliphatic bases such as dimethylamine also give stable dithiocarbamates which are very powerful accelerators.

Thiocarbanilide, which is perhaps the most widely used commercial accelerator, is formed by the same mechanism of reaction, there first being formed the aniline salt of phenyl-dithiocarbamic acid.

This aniline salt is extremely unstable due to the weak basic properties of aniline and cannot be isolated as such. The ammonium salt of this phenyl-dithiocarbamic acid may be isolated

[1]Published by courtesy of the American Chemical Society. Paper read before the Rubber Division of the American Chemical Society, Philadelphia, Pennsylvania, September 2 to 6, 1919.

but decomposes on standing. The metallic salts of dithiocarbamic acids are much more stable according to Krulla.[2]

The aniline salt, by loss of hydrogen sulphide, produces thiocarbanilide.

The stable dithocarbamates above mentioned lose hydrogen sulphide in a similar manner when heated to the temperatures used in the vulcanization of rubber and produce thiourea derivatives. It is, therefore, quite possible that they may function as curing agents in the same manner as thiocarbanilide.

André Dubosc[3] has stated that thiourea derivatives can "furnish in a colloidal state all the sulphur necessary for vulcanization." In checking up this statement it appeared at first that Dubosc was correct, but the cures obtained were soon shown to be due to free sulphur present as an impurity in the accelerator used. Pure thiocarbanilide and pure dithiocarbamates do not vulcanize rubber in the absence of free sulphur either in a pure gum or high zinc oxide stock. We, therefore, are unable to agree with this investigator that the sulphur of such compounds is available for vulcanization.

There are some dithiocarbamates which liberates the free base by a heat decomposition, such, for example, as the liberation of dimethylamine by heating its carbon disulphide reaction product. Since these free bases are evidently good curing agents, it is possible that they may function as accelerators after being liberated by a heat decomposition of the dithiocarbamates. It is, however, not the object of this paper to discuss the mechanism of the action of thiourea derivatives as accelerators. What we wish to show is that there are many accelerators not ordinarily, classed with thiocarbanilide but which undoubtedly produce thiourea derivatives by reason with sulphur during the vulcanization process, so that they may be classed as being similar to thiocarbanilide in their ultimate action.

In June, 1913, J. Bastide was granted a patent[4] wherein he claimed methylene and ethylene compounds of aliphatic and aromatic amines as vulcanization accelerators. As specific examples he mentions methylene-diphenyl-diamine and phenyl-iminomethane, the latter being otherwise known as anhydro-formaldehyde-aniline or methylene-aniline. These two accelerators easily react with sulphur to form thiourea derivatives.

Methylene-aniline easily polymerizes to the di-, tri-, and probably higher polymers. We have found it convenient to consider it as the dipolymer and to take 210 as the molecular weight. It has been found that 210 grams of methylene-aniline will react with four atomic weights of sulphur, whereby one molecular weight of carbon bisulphide and one molecular weight of hydrogen sulphide are lost and that about 95 per cent of the product is thiocarbanilide.

This reaction starts at about 130 degrees C. and proceeds best at 150 degrees C. The amount of carbon bisulphide liberated may be determined by condensing as much as possible and weighing. Any uncondensed carbon bisulphide vapors may be caught in aniline wash bottles which have previously been saturated with hydrogen sulphide. The amount of hydrogen sulphide may be determined by absorption in caustic. A small amount of aniline and other products are formed by side reactions.

It is quite probable from the above data that methylene-aniline, when compounded as such, will generate carbon bisulphide during the cure. In the presence of basic amido compounds this carbon bisulphide should at once generate dithiocarbamates, similar to those which have been shown by Ostromislensky to have such high curing power. The curing power of methylene-aniline may, therefore, be due in part to the formation of dithiocarbamates formed from carbon bisulphide liberated slowly in the cure and a subsequent reaction with amido compounds which may be present, but its chief curing power is evidently due to the direct formation of thiocarbanilide. It must not be assumed, however, that methylene-aniline should therefore have as strong a curing power as thiocarbanilide. That this is not the case is undoubtedly due to the lag of the sulphur reaction during the cure.

Methylene-diphenyl-diamine produces several reaction products when heated with sulphur, the reaction proceeding easily at 140 degrees—150 degrees C.

(a) A certain amount of the thiocarbanilide is formed, but the yield is comparatively low.

(*b*) Methylene-diphenyl-diamine by heat alone loses aniline, probably by a semidine reaction with itself.

This reaction may be continued until the condensation has proceeded so far that one mole of the original compound has lost one mole of aniline. By reaction with sulphur before compounding and removal of such free aniline as may be formed, there is produced an accelerator of much greater curing power than the original material and which shows curing properties very similar to those of thiocarbanilide. One of the constituents of this reaction is apparently a sulphur reaction product. Another very closely resembles thiocarbanilide and is probably one of the reaction products which is formed from methylene-diphenyl-diamine when this compound is used as an accelerator for the vulcanization of rubber.

(*c*) Methylene-diphenyl-diamine in the presence of aniline, either added as such or formed by reaction (*b*), undergoes a semidine transformation with the aniline at temperatures even lower than milling temperatures. Paramido-benzyl-aniline is a liquid which is crystallizable with difficulty and forms so easily from the other reaction product that there is no difference in the curing power of the two compounds. Paramido-benzyl-aniline reacts easily with sulphur to produce para-amido-thiobenzanilide.

The latter is another compound very similar to thiocarbanilide, to which may be attributed a portion of the curing power of the original accelerator.

The main reaction of this type of methylene accelerators is evidently to substitute thiocarbonyl groups for methylene groups. This produces compounds very similar to thiocarbanilide and which may be considered as being derived from thiocarbanilide by similar condensation and semidine reactions, although we have been unable to prepare them directly from thiocarbanilide.

In the interaction of hexamethylene-tetramine with sulphur during the cure, we have another possibility of the formation of carbon bisulphide reaction products with amines. Hexamethylene-tetramine reacts very readily with sulphur at curing temperatures, producing a multitude of products including hydrogen sulphide, ammonia and carbon bisulphide in large amounts. Dubosc[5] has described the sulphur reaction products of hexamethylene-tetramine, but for some unaccountable reason has absolutely overlooked two of the main reaction products, ammonia and carbon bisulphide. The accelerating action of hexamethylene-tetramine may therefore be explained by the interaction of this ammonia and carbon bisulphid to form a dithiocarbamate. This allows us to classify hexamethylene-tetramine as a thiourea accelerator.

With a large majority of accelerators there is no possibility of the formation of thiourea derivatives by a reaction with sulphur. As far as is known, all accelerators containing methylene groups, similar to those described, react easily with sulphur at curing temperatures to produce thiourea derivatives. This does not include, however, the methylene groups of such compounds as piperdine, or penta-methylene-diamine which on heating loses ammonia and forms piperidine.

SUMMARY.

1.—Organic accelerators containing methylene groups, similar to those described, readily react with sulphur to produce thiourea derivatives.

2.—These sulphur reactions take place at curing temperatures and may throw some light on the mechanism of the reactions of these accelerators during vulcanization.

[2] "*Chemische Berichten*," volume 46, page 2669.
[3] "The India Rubber World," February 1, 1919.
[4] French Patent No. 470,883.
[5] Locus citatus.

Volume Increase of Compounded Rubber Under Strain.[1]

By H. F. Schippel.

THE FIRST RECORD of this interesting phenomenon of volume increase in rubber under strain dates back as far as 1884, when Joule recorded the fact that the specific gravity of rubber decreased upon stretching it. His test results stated a change of specific gravity of 0.15 per cent for a 100 per cent stretch. This is a very small increase, and therefore his experiments were made upon comparatively pure rubber, unmixed with pigments, as the present paper will show.

In 1889, Mallock made tests upon pigmented rubbers of different kinds, but he made the volume elasticity tests upon the samples only by applying pressure to the water in which he immersed them, thereby simply corroborating the results of the previous investigator.

Again, in 1890, Sir William Thomson stated that a column of rubber when stretched out suffers no sensible change in volume, and that the contraction of any transverse diameter must be sensibly equal to one-half of the longitudinal extension, and rubber may therefore be regarded as an incompressible elastic solid. This also is true of pure rubber.

While studying the nature of the stress-strain curves for rubber containing different pigments in varying quantities, the writer considered the stability of the rubber surrounding each particle of pigment in the rubber body, and thought that possibly when the rubber body was elongated sufficiently, the rubber might pull away from the particles of pigment in their axes of stress, and cause vacua to be formed on both sides of each particle, the net result of which should be a considerable increase in the volume of the rubber body as a whole.

A preliminary test was made by preparing a transparent vulcanized compound containing a fair proportion of medium-sized lead shot. When this compound was stretched, the formation of vacua proceeded gradually until each lead shot had its conical vacua on both sides in the direction of strain. This was very satisfactory, and the test was immediately applied to miscellaneous samples of rubber compounds, with the result that this integral phenomenon was actually found to take place. It was more noticeable in the red rubber than in the white. Also, after keeping the samples under tension for some time, and then releasing, temporary increase of volume was noted, which was due to sub-permanent set, or the diffusion of gases into the vacua, or both. In certain cases, the observed volume increases under simple strain were very remarkable. For example, a specimen made up of 100 grams of fine Pará, 30 grams of litharge, 5 grams of sulphur, and 337 grams of whiting, and press cured for 30 minutes at 40 pounds' steam pressure, gave a volume increase of 52 per cent at an elongation of 140 per cent, while the estimated volume increase for a similar compound containing 215 grams of barytes in place of the whiting was 120 per cent at the breaking point. In the former case, the average value of Poisson's ratio up to the breaking point was 0.39 and in the latter case 0.31. These values are not at all abnormal, but their cumulative effect in a substance which has the ability to withstand comparatively enormous elastic strains is worthy of serious consideration from a physical standpoint.

For smaller percentages by volume of barytes, the volume increase was found to be less at the breaking point, and similarly for larger volume percentages, due in the latter case to the formation of local contractions similar to that of metals.

It was also noted that when barytes was substituted by an equal volume of lampblack, the volume increases for any given elongation were smaller.

Systematic tests were accordingly made upon a series of compounds containing in various volume percentages one of the following pigments in each case: barytes, whiting, zinc oxide, china clay, red oxide, lampblack, and carbon black. The curves shown give graphically the results obtained.

The common base was made up of 100 parts by weight of fine Pará, 5 parts sulphur and 30 parts litharge, the weight of the test pigment added in any case being the volume index for that case multiplied by the specific gravity of the pigment.

A blank test was made by stretching the base only without any other pigment content. The curve obtained is marked "O" on each series of curves for the pigments.

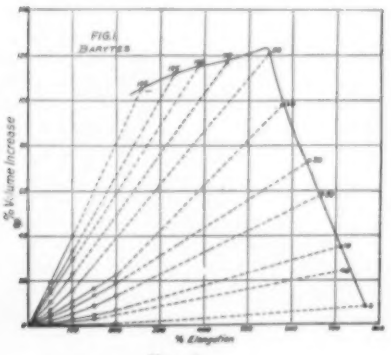


FIG. 1.

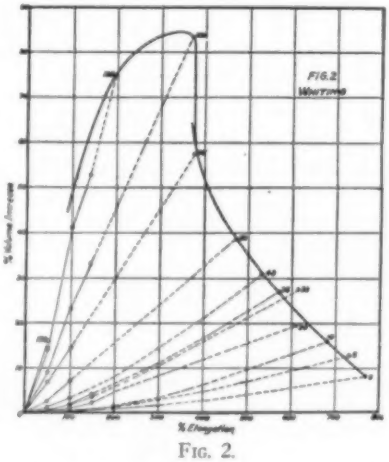


FIG. 2.

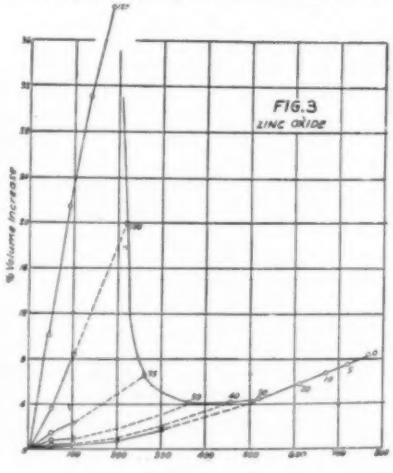


FIG. 3.

METHOD OF PROCEDURE.

Test rings, having a cross-sectional diameter of ½ inch, and an outside diameter of 2¼ inches, were made from each compound up to about 35 volumes content. For volumes above this, the compounds were too stiff to make a perfect fit in the ring mold, and flat slabs about 100 mils. thick were made, from which flat rings were cut. The internal circumference of the rings was approximately four inches. Each ring was stretched consecutively over each of a graduated series of steel bars from three to eight inches long, or as far as the ultimate stretch of the rubber would allow, and the volume increase was calculated by

[1] Published by courtesy of the American Chemical Society. Paper read before the Rubber Division of the American Chemical Society, at Philadelphia, Pennsylvania, September 4, 1919.

determining the change of specific gravity. This method, which avoided the construction of any special apparatus, and was very accurate, was the suggestion of Mr. W. B. Wiegand, whose inspiring cooperation in this and other rubber researches the writer takes pleasure in acknowledging.

(1) BARYTES: The test results are shown by that part of each curve in full line. It was found impossible to obtain higher elongations than 200 per cent for the large rings, owing to their failure by slow tearing when stretched above this value. The curves approximate closely to straight lines, showing that the volume increase varies almost directly with the elongation. Also for a constant elongation, the volume increases progresses with the percentage of barytes in a roughly proportionate manner. There appears to be no adhesion whatever (or very little) between the rubber and the particles of barytes, because there is a volume increase in the compound containing only five volumes of barytes. The particles are certainly not crowded in a five per cent mix, and their surfaces do not necessarily transmit the whole local stress, but on account of this early separation of the pigment particles from the rubber, the particles take no important part in the stress-strain curve for the body, since the stress is transmitted through the rubber only.

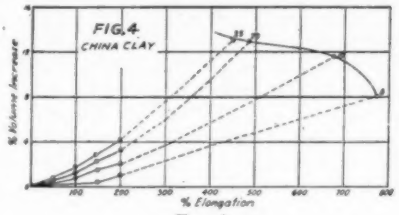


FIG. 4.

It was thought that possibly the large volume increases might be due to the pigment entering the rubber in agglomerated masses, and that most of the increase in volume might be due to the ready separation from one another of particles which were in dry contact. Accordingly, two tests were made to determine this, one test of a sample of compound milled for 60 minutes instead of 21 minutes for the normal mix, and another test upon a sample which was softened to cement consistency in gasoline, thoroughly mixed, dried, and press-cured as usual. The excessively milled sample showed a very slight increase of percentage volume increase, but the decrease of this property in the cement sample was more considerable. The entry of the gasoline into the compound presumably softened the rubber and allowed it to flow around each particle, wetting the whole mass of pigment thoroughly; so that, although part of the volume increase under stretch is due to the separation of pigment surfaces in dry contact, the larger part of the increase is due to rubber separation from the surface of the particles.

The curves were extended as shown by the dotted lines to the point corresponding to the ultimate percentage elongation as obtained from standard breaking tests on a tensile testing machine. The full-line curve joining these points is of special interest. The discontinuity above 50 volumes is due to the formation of local contractions in the test ring, so that the whole body of rubber does not receive the same proportional elongation. The neck is similar to that formed on metal specimens. By mechanically working the rubber rings until the stiffness is removed, greater volume increases are obtained, *i. e.*, we obtain points on the true extension of these curves. In the same way higher elongations could be obtained on the tensile testing machine.

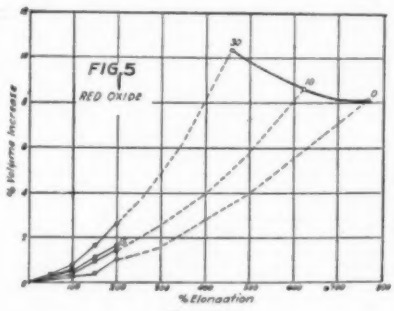


FIG. 5.

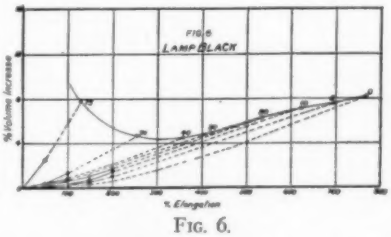


FIG. 6.

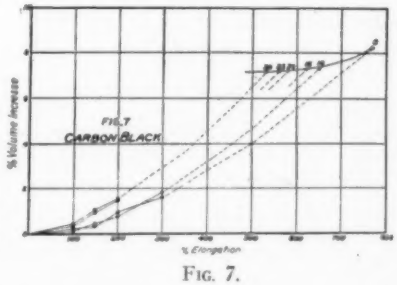


FIG. 7.

(2) WHITING. The curves for this series of compounds show that up to 40 volumes of whiting, the percentage increase is comparatively small, then there is a sudden jump in volume increase with further addition of pigments, until at 150 volumes the whiting gives results almost equal to those with barytes. This probably is due to agglomeration of the pigment particles when present in large amounts. It should be noted that these curves are plotted on a more open scale of per cent volume increase than that of the barytes.

(3) ZINC OXIDE.—The trend of the zinc oxide curves up to 30 volumes is identical with that of the basic mix, although the ultimate elongation is reduced as much as 250 per cent. This shows that there is a strong adhesion of the rubber to the particles of zinc oxide, which imparts additional strength to the basic mix, but which reduces the ultimate elongation on account of the dilution of the rubber. This phenomenon classifies zinc oxide physically with the finer pigments, lampblack and carbon black. The upward shift of the curves for volumes above 30 indicate a rapid growth of agglomerated masses of particles which greatly reduce the tensile strength of these compounds. The shape of the almost complete 125-volume curve indicates that the large extrapolations of the other curves are approximately correct.

(4) CHINA CLAY.—The range of volumes experimented upon is not so large, but there is indicated an increase in volume for the low percentages of pigment. The open scale of "volume increase" to which these curves are plotted should be noted. The trend of these low volume curves away from the basic mix curves shows that the addition of china clay to rubber lowers the tensile effect upon the compound.

(5) RED OXIDE.—The red oxide, being a finer pigment than china clay, shows less volume increase under strain. Also, departure from the curve of the basic mix shows a weakening effect upon the compound.

(6) LAMPBLACK.—The volume increase of the lampblack compounds is graduated proportionally to the content of lampblack up to 50 volumes. The 75-volume compound shows a considerable rise of volume increase, which indicates a rapidly increasing agglomeration of the particles. This means that the limit of ability of the rubber to wet each particle of lampblack has been reached at 50 volumes, and above this volume the rubber surrounds groups of particles instead of embedding each particle individually.

(7) CARBON BLACK.—A 30-volume content of carbon black lowers the ultimate elongation of the rubber to 530 per cent, while the same volume of lampblack lowers it to 420 per cent. This indicates a greater weakening effect of the lampblack on the rubber, although the volume increase under equal strain is less.

CURVES FOR 50 PER CENT AND 100 PER CENT STRENGTH.—Figs. 8 and 9 show the property of volume increase in a different light. Here the variation of percentage volume increases is shown on

a "volume of pigment" base for constant elongations of 50 per cent and 100 per cent. These curves are really a more distinct representation of the growth of agglomerated masses of pigment as the volume of pigment is increased. It will be noticed that at 100 per cent strength the whiting and zinc oxide curves tend to approach the barytes curve, due to the more rapid formation of agglomerated masses of these pigments than that of the barytes. Since the average particle of whiting has only one-eighth the volume of the average particle of barytes, it would require an agglomeration of the whole body of whiting into average groups of eight particles each to cause the whiting curve to meet the barytes curve, or multiples of eight, if there already existed an agglomeration of the barytes particles. This agglomeration of the pigment particles and the phenomena connected with it are of vital importance, since the sudden growth of agglomerated particles at certain volumes may be coincident with a rapid increase of hysteresis, due to the friction when the rubber body is distorted, amongst those particles which are in dry contact with each other. Conversely, any means of reducing the agglomeration of pigment should also be the means of reducing the hysteresis, such as the method of milling, and the use of solvents to reduce the viscosity of the rubber while mixing in the pigment.

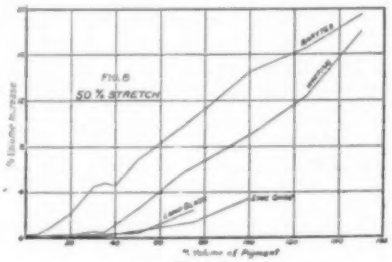


FIG. 8.

Fig. 10 shows the percentage volume increase at failure on a base of percentage pigment, plotted up to the point of maximum volume increase, which takes place, as mentioned before, when local contraction of area occurs. These maximum points, as shown for the three pigments barytes, whiting, and zinc oxide, lie approximately on a circle having the origin as center. The lampblack curve cannot be extended sufficiently far to reach the maximum volume increase due to the inability of the rubber to absorb large quantities of lampblack. The curves for china clay, red oxide, and carbon black are not shown, but as far as they have obtained, the fall between whiting and zinc oxide, the china clay lying highest and the carbon black lowest of the three.

Fig. 11 undoubtedly shows the real explanation of the variability of the pigments from the volume increase standpoint. They show that, with the exception of zinc oxide, the greater the mean diameter of the pigment particles, the greater is the volume increase under strain. A confirmation of this statement was the result of a test on four samples of barytes compounds, containing equal volumes of barytes of different degrees of fineness. The different grades were prepared by allutriation in water. The compound containing the finest grade of barytes showed the least volume increase under strain. This was a critical test which eliminated every other variable but the size of the pigment.

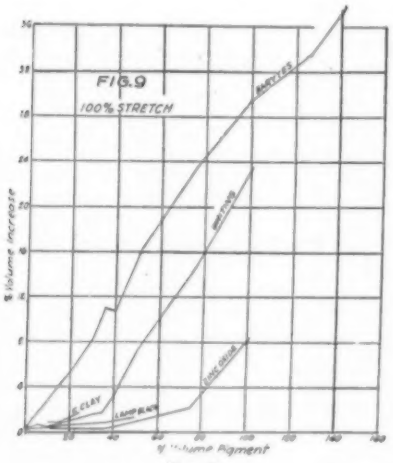


FIG. 9.

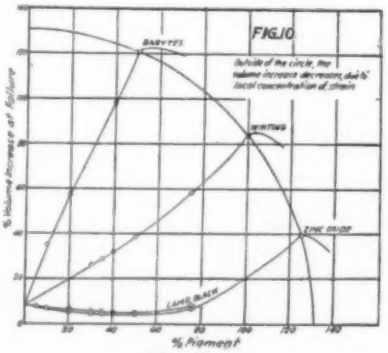


FIG. 10.

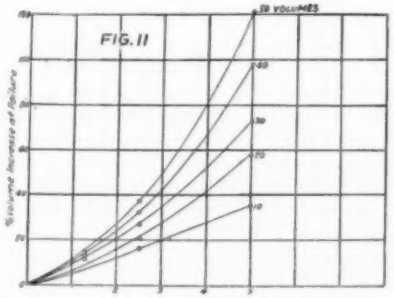


FIG. 11.

A NEW FIELD FOR RUBBER CULTURE.

Papua or British New Guinea is entering the plantation rubber field in earnest. One company has nearly 2000 acres with 152,000 trees, over 50,000 of which are tappable; it produced 89,938 pounds of rubber in 1918 as compared with 54,303 pounds in 1917. Another company has 920 acres planted with *Hevea*. With the rise in the price of rubber, or if Australia will establish preferential trade conditions, the Papuan rubber may compete in Australia with that from Singapore.

NEW ZEALAND TIRE IMPORTS.

The value of New Zealand's tire imports for 1916 was £639,719, for 1917 £453,893, for 1918 £702,026, and for the first four months of 1919 £334,472.

The following tabulation shows the total value of motor car tires imported at each port in New Zealand and the country of shipments and origin during the month of May, 1919:

From.	Origin of Shipment	Auckland.	Wellington.	Lyttelton.	Dunedin.	Other Ports.	Totals.
United Kingdom	U. K.	£35	£1,874	£6,489	£23	£1,254	£9,675
United Kingdom	France	.....	.....	18,185	.....	.....	18,185
Canada, via East Coast	Canada	1,239	1,022	.....	.....	1,430	3,691
Canada, via West Coast	Canada	2,032	2,785	.....	1,409	.....	6,226
Canada, via West Coast	U. K.	53	.....	.....	.....	.....	53
Australia	Australia	7,662	6,482	10,843	.....	.....	24,987
Australia	U. K.	54	31	.....	.....	.....	85
Australia	France	.....	481	.....	.....	.....	481
Australia	U. S. A.	396	.....	12	.....	.....	408
France	France	.....	.....	13,959	.....	.....	13,959
United States, via East Coast	U. S. A.	1,538	7,618	9,167	322	410	19,061
United States, via West Coast	U. S. A.	516	18,468	1.668	193	.....	20,845
Totals	.....	£13,525	£38,761	£60.323	£1,947	£3,100	£117,656

U. S. Army Methods of Procuring and Salvaging Rubber Articles

By John J. Cameron.

THE TREMENDOUS DEMANDS of the Army during the war for articles of rubber, numbering thousands of separate items, were met, because the Army took practically the entire capacity of all the mills in the United States, because at all times the manufacturers of rubber goods gave the Government their best services and did all in their power to meet the heavy demands made upon them, and because of the great savings made in salvaging articles containing rubber.

ARTICLES PURCHASED BY CLOTHING AND EQUIPAGE DIVISION.

The chief purchases of rubber goods made during the war by the Clothing and Equipage Division, Office of the Quartermaster General, Director of Purchase and Storage, which is charged with furnishing all the clothing for the Army, were:

Article.	Purchases. Apr. 1, 1917- Nov.11,1918.	Deliveries. Apr.1,1917- Dec.17,1919.
Rubber boots, hip.....*pairs*	3,644,280	2,885,082
Rubber boots, knee.....*pairs*	562,163	521,663
Overshoes, arctic .....*pairs*	3,222,160	3,222,160
Raincoats, foot (including slickers and ponchos)	**8,783,074**	**8,255,950**
Raincoats, mounted	100,000	96,996
Oilskin coats	1,652,532	734,068
Oilskin hats	1,703,170	954,252
Oilskin trousers	1,646,822	728,448

The difference in purchases and deliveries are accounted for by contracts cancelled or in the process of cancellation.

The reasons for these enormous purchases are largely accounted for by the fact that the consumption in action is three or four times that of the peace rate. The rule generally followed in supplying clothing was that there should be for each

(Signal Corps, A. E. F., U. S. Army.)

RUBBER REPAIR DEPARTMENT OF THE SALVAGE DEPOT, ST. PIERRE-DES-CORPS, FRANCE. HERE ALL RUBBER GOODS ARE REPAIRED. THE MEN IN THE BACKGROUND ARE REPAIRING AND VULCANIZING RUBBER BOOTS.

man at the front a three months' reserve in France, another two or three months' reserve in the United States, and another three months' supply in transit.

In supplying articles of rubber, which are matters of common commercial production, however, the problem was not as difficult as compared with the making of gas masks, an article not before manufactured. But the large needs of initial equipment did put an enormous strain on the industries turning out rubber goods. Of the different types of rubber boots purchased by the Clothing Equipage Division, there were more than 4,000,000 pairs, costing more than $20,500,000, one-half of which were purchased by the Clothing and Equipage Division since January, 1918.

Supplying our soldiers with raincoats was a difficult problem. As there was not a sufficient capacity in this country to meet the requirements, practically all stocks of commercial raincoats were purchased on the assumption that even a poor cover was better than none. In October, 1918, for instance, when the influenza epidemic was prevalent in the West, it was found that there was a great shortage of raincoats made in accordance with government specifications. As there was no one place in the zone where commercial raincoats could be bought in large quantities, it was necessary to go into the open market and purchase these coats from jobbers, and retailers, large and small. Authorization was secured from Washington, and the San Francisco Depot at this time purchased approximately 69,175 raincoats, valued $280,462.

The total purchases of ponchos, raincoats and slickers during the war amounted to over 10,000,000 garments, costing $46,000,000.

The lack of tonnage led to the adoption of baling garments for shipment overseas as compared with the old method of boxing them. By baling there is saved from 50 to 70 per cent of the space required for cased goods. Nine and nine-tenths blankets cased require as much space as 25 blankets baled, and fifteen and one-half slickers cased require as much space as 45 slickers baled.

Statistics recently prepared showed that this method of packing equipage, which includes all forms of clothing, such as uniforms, boots, etc., saved the Government during the war over $50,000,000 in labor, time of handling, and ship tonnage space.

ARTICLES PURCHASED BY MOTORS AND VEHICLES DIVISION.

Next in importance to the purchases of rubber made by the Clothing and Equipage Division were those made by the present Motors and Vehicles Division of the Office of the Quartermaster General, Director of Purchase and Storage. Exhaustive tire tests were made from time to time and orders placed with manufacturers who met the specifications. Tube and solid tire replacements for overseas use were heavy because of the condition surrounding operations of the vehicles.

The total amounts of rubber material purchased by the Motors and Vehicles Division of the Office of the Quartermaster General, Director of Purchase and Storage, from April 18, 1918, when the procurement of motor vehicles, tires and spare parts was consolidated in the Quartermaster Corps, and all the motor vehicle procuring organizations of all the corps of the Army from April 6, 1917, to December 16, 1919, were as follows:

Article.	Quantity.	Value.
Tires	325,983	$13,655,363.72
Tubes	898,092	2,331,439.84
Casings	784,145	15,654,601.56
Class "B" Solids (original equipment).....	108,127	4,798,552.38
Hose and tubing .....*feet*	576,936	105,851.69
Patches (tire) .....*pieces*	121,873	21,096.18
Vulcanizing rubber .....*pounds*	729	552.94
Battery parts, hard rubber.....*pieces*	17,028	1,999.62
Miscellaneous	2,188	822.13
Grand total		$36,570,280.06

The cancellation of tires and tubes made up to June 30, 1919, amounted to 157,974 units, or 2,704.69 tons.

COOPERATION OF RUBBER MANUFACTURERS.

The second factor enabling the Government to obtain the necessary products made of rubber was the cooperation of the manufacturers who helped solve the problem by giving their services and converting their plants. Crude rubber was supplied to the factories through The Rubber Association of America, Inc. The allocation of raw materials was one of the chief

functions of this association. The Rubber Association on May 10, 1918, called all rubber manufacturers to a meeting in New York. At this time they were notified that the plan of allocating crude rubber under a limited tonnage arrangement for the months of May, June and July would only give each manufacturer one-fourth of the seven-sixteenths of the amount of crude rubber which each company had received throughout the year 1917. The allocation of crude rubber on July 31 was reduced to three-eighths instead of seven-sixteenths, based on the average 1917 consumption of each factory.

As showing the cooperation that existed between the manufacturers of products and the Government, the manner in which prices were fixed for rubber footwear may be cited. A letter, first of all, was addressed to the various manufacturers specifying prices and asking their concurrence. On further consideration, these prices proving incorrect, it was decided to make a more extended examination of the cost of manufacture before fixing the prices. Accordingly, a meeting of the manufacturers was held in Washington. A committee was then appointed consisting of representatives of the important rubber manufactories of the country and representatives of the Clothing and Equipage Division, with the understanding that the committee would meet in New York and consider in detail the cost sheets of the various manufacturers. The price fixed in accordance with recommendation of this committee was $5.25 a pair for hip pressure boots, with variations in price for other boots and for additional features.

SALVAGE SERVICE OF THE QUARTERMASTER CORPS ABROAD.

The third reason that the Government was able to have its demands for rubber articles supplied was due to the Salvage Service of the Quartermaster Corps, both here and abroad. Early the attention of the Army was called to the fact that rubber was not only expensive and limited in quantity, but that owing to the peculiar properties of rubber the greatest amount of care had to be taken in salvaging rubber properly.

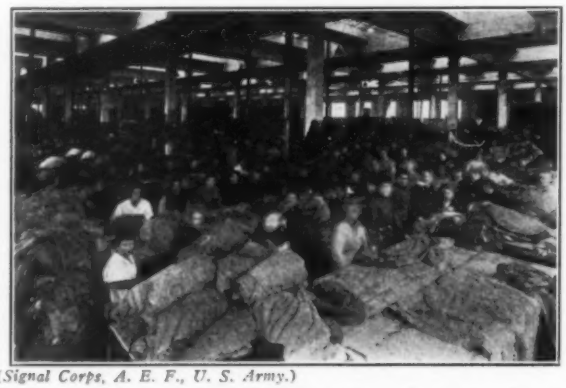
The rubber salvaged in the A. E. F. for the year 1918 totaled 1,591,565 pounds.

The general plan of salvaging a front line sector which met with the best results consisted in outlining the main boundaries, then dividing the immediate districts into definite sectors and assigning a suitable personnel with an adequate amount of transportation to clean up the area. The salvage that was collected from this area was collected in huge piles known as advance dumps. These dumps were for convenience placed on lines of auto truck, and, if possible, rail travel. Serviceable material was held for reissue, while the other property, after being sorted, was sent to the interior depots. During an offensive operation the primary object of salvage was to collect those particular articles of salvage which were in constant demand at such a time and to return such serviceable articles with the least possible delay to the troops. Serviceable material suitable for immediate reissue was turned over to quartermaster or ordnance personnel at the collection dumps, if there was need of this material. If not, it followed the same course as any other salvage and went on to the rear. At all times, preference in salvage operations was given to perishable material, such as clothing and articles made of rubber, while articles that would not suffer from exposure were left for salvaging after the perishable things had been gathered.

Pioneer infantry and labor battalions assisted in the collection of salvage in the St. Mihiel offensive. Following heavy offensive large numbers of line troops were also employed in the collection work. It was estimated that at least 400 men for each division in the line should start salvaging when the line had stabilized after an offensive. So rapid and well organized was the work of salvage to avoid deterioration of equipment, that out of $3,100,000 worth of salvaged materials, 87 per cent of the ordnance and 47 per cent of the quartermaster property recovered was available for immediate reissue, thus largely reducing the amount shipped to the shops and depots for renovation and repair.

THE VALUE OF POSTER ADVERTISING.

The idea of salvage was a novelty and it would not be expected at first that men would save instinctively. Education along this line was needed and a definite form of propaganda was put forward to educate the men into the idea of cutting down waste.



(Signal Corps, A. E. F., U. S. Army.)

RECLAIMING SLICKERS AND SHELTER HALVES AT THE SALVAGE DEPOT, ST. PIERRE-DES-CORPS, FRANCE.

Posters and placards were printed and posted in conspicuous places calling attention to the proximity of a salvage dump or urging them to take better care of government property. One poster read: "Yank Motto—DO NOT LET Government Property Lie Around, It Spoils—TURN IT IN TO SALVAGE." Another in heavy black-faced type said: "Americans, Did You Do Anything to Help the Salvage Service To-day? Pick it up, Send it to Salvage." Still another warned the men to, "SHOOT STRAIGHT—Serve Your Country Honestly—Start To-day to Salvage." For designing salvage dumps, posters read: "SALVAGE—American Salvage Dump is Located at..... Save It—Send It to Salvage."

So effectively was this advertising campaign carried on that it was nothing unusual to see men returning from the lines with odds and ends of material that they had picked up on the field. In some cases the articles were in good repair and immediately serviceable. Others could be repaired and reissued. In still other cases it was a remnant of old harness or a piece of tattered clothing, articles perhaps of little intrinsic value in themselves, but the total numbers mounted into millions. The piece of leather, for example, which might have appeared to be an utterly worthless scrap, when collected with other scrap leather could be sold to mills and foundries for use in manufacture of carbon and case hardened steels.

Waste sales alone in 1918 totaled $39,680, while in the month of April, 1919, the sum had reached $248,675.55.

DEPOTS FOR SALVAGED MATERIALS.

Plants where unserviceable material was repaired were known in general as "Depots" or "Shops." Shops served local troops and were conveniently located at certain base ports and troop centers, while depots were situated at distribution points in the interior. Shops were in operation at Angers, Paris, Bazeilles, Savenay, Gievres, Chaumont, St. Aignan, Brest, Rochefort, Vittel, Le Mans, Tours, Nancy, and Marseilles, as well as in Winchester, England, and Coblentz, Germany. One hundred and eight buildings, with a ground space of 2,574,080 square feet, were occupied in February, 1919, by the Salvage Service, A. E. F. The combined floor space of depots, shops, and laundries was 989,860 square feet, of which 177,425 square feet was built and

owned by the United States, the rest being leased. At shops, repaired articles were in nearly all cases returned to the original wearers.

While the shops handled a large amount of the material and clothing to be repaired, it was obvious that with a military organization the size of the A. E. F. there must be a series of larger depots in the rear to handle the great mass of property collected from the field. To meet this need, the depots at Lyon, Bordeaux, Nantes, St. Nazaire and St. Pierre-des-Corps were established. To these depots, which included seven departments, viz., laundry, clothing, shoes, rubber goods, leather and harness, canvas, webbing and metals, came the grist that had been taken from the battlefield, billet, training area and other sources. Material arrived in all sorts of quantities and conditions. Nothing was too big or too small to be taken care of in these great modern repair plants. While each shop or depot was complete in itself and could handle any sort of repair work it was found often more practicable to designate some special line of work for each of the various places. For instance, the shop at Angers, started July 23, 1918, repaired hundreds of thousands of campaign hats. The general shop at Paris handled large quantities of laundry because of the facilities offered in this line by the French metropolis. To whatever depot the material came, there it was disinfected, laundered and repaired as needed. Then, from the salvage depots the reclaimed material was shipped to general supply depots for reissue.

A DEPOT IS A MODERN INDUSTRIAL PLANT.

In order to give some idea of just what a depot should consist of, the one at St. Pierre-des-Corps may be taken as an example of all the salvage depots in the A. E. F. The buildings taken over at this place had been used by the French for railroad shops and storage purposes. Under American control they presented a vast hive of industry, with workers, most of them women, seated at long rows of tables, sometimes eight hundred in a single room. There were three of these buildings, one with an area of 20,000 square feet, another of 100,000 square feet and a third of 40,000 square feet. Three other buildings, 50 by 180 feet, were later constructed. The buildings were of cement construction, light, well ventilated, and traversed by railroad tracks so arranged as to enable quick loading and unloading of cars.

(Signal Corps, A. E. F., U. S. Army.)

SALVAGE DUMP OF THE 26TH DIVISION, NANTEUIL-SUR-MARNE, FRANCE. RAINCOATS, SLICKERS AND PONCHOS READY FOR TRANSPORT BY TRUCK TO THE RAILROAD CARS.

Considerable improvement was effected in the buildings by the United States Engineers and Quartermaster Corps to adapt them for the purpose intended. A large power plant was installed consisting of a 300-h.-p. steam boiler, a 300-h,-p, steam engine and a 225-kilowatt electric generator. Live steam for the laundry was furnished by two 125-h.-p. locomotive type boilers, to facilitate sterilization, washing and drying operations as well as to speed up the drying of slickers and rubber boots in the rubber goods department.

Rubber boots, arctics, slickers, ponchos, and shelter halves were the articles handled by the rubber goods department. About 3,000 garments and 850 pairs of boots was the output of a twenty-four-hour day by this one depot. Slickers were first washed, then examined, the bad garments being used to provide material to repair the good. Patches that were basted on by hand went to the machines where they were stitched and the seams cemented and turned to insure them being waterproof. Boots after being washed were fitted with new taps. These were fastened with cold cement while the heels were first cemented and then nailed. Upper patches made from irreparable boots were cemented and rolled. Vulcanizing machines were installed in the process of factory development and replaced the slower method of patching.

A commissioned officer with five non-commissioned officers and 17 enlisted men composed the American personnel of the St. Pierre-des-Corps Depots, while 28 male and 290 female civilians were employed in this branch. The average wage to the female workers was from 7 to 8 francs a day, while the piece workers received as much as 18 francs a day. Production for the month of August, 1918, was valued at $231,113.83 for this one depot.

The month of April, 1919, broke all records of the A. E. F. Salvage Service with a total saving made of $13,877,872.07. Some idea of the scope of these operations can be obtained from a list of articles turned out during the month, the list including:

Article.	Quantity.
Rubber goods articles	110,596
Service hats	51,628
Articles of clothing	2,944,563
Pairs of shoes	436 144
Articles of canvas and webbing	246,679
Articles of leather and harness	20,402
Metal articles	260,288

The saving of scrap rubber was a very important function of the Q. M. C. Salvage Service, A. E. F. Some 1,591,565 pounds of rubber were sent back to the United States during 1918. After the signing of the armistice, the disposition of scrap rubber was placed in Europe.

THE RECORD OF SALVAGE DIVISION AT HOME.

The record of the Salvage Division in this country during the war is equally impressive. During the fiscal year ended June 30, 1919, the Salvage Division of the Office of the Quartermaster General, Director of Purchase and Storage, renovated and returned to service the following articles made of rubber goods:

Article.	Fiscal Year, 1919.	Estimated Value.
Arctics ..... *pairs*	27,470	$116,198
Boots, rubber ..... *pairs*	5,441	18,499
Slickers and raincoats	88,386	256,319
Ponchos	72,275	130,095

During the same period there was collected in the United States 4,737,975 pounds of rubber waste. Of this quantity, 2,492,417 pounds were sold for a value of $93,846; a total of 564,500 pounds turned over to Army organizations representing a value of $42,586. In the period from July 1 to November 1, the Salvage Division sold 691,100 pounds of rubber for a value of $42,009.84. In the same period there were turned over to Army organizations 14,567 pounds, representing a value of $1,456.70.

The following formula is employed by the Salvage Division in washing raincoats and slickers: (1) ten minutes in cold suds; (2) cold rinse, five minutes; (3) from the washing machine the coats are taken to dry tumblers where they are run for about 10 minutes. Then these coats are allowed to hang for 12 hours. The cost of washing a slicker by this formula was 35 cents per garment in the United States.

War Department Specifications for Mechanical Rubber Goods.

General Specifications for Mechanical Rubber Goods.

War Department Specification No. 333-1-1—June 5, 1919.

THESE SPECIFICATIONS cover mechanical rubber goods used by the War Department. The following are details of such specifications and tests as are common to the articles. For specific information applying directly to particular articles, see detailed specifications which shall take precedence whenever there is any conflict.

CONSTRUCTION.

To be manufactured from the best material designated, free from any and all imperfections and of dimensions as given in the detailed specifications or proposal submitted to manufacturer.

(*a*) HOSE.—Rubber hose shall consist of a rubber tube, cotton reinforcements, and a rubber cover, and shall be of wrapped construction unless otherwise specified in detailed specifications.

Tube and cover of wrapped hose shall be smooth, free from pitting and imperfections, and of uniform thickness. All cotton canvas layers shall be applied on the bias, with edges lapped at least ½-inch (not sewed), and be well impregnated with a composition to comply with the detailed specifications.

Plies of braided hose shall be evenly braided and imbedded in a properly vulcanized rubber compound best adapted to meet the requirements.

(*b*) COUPLINGS.—Each length of hose shall be properly fitted with couplings and clamps without the use of tape or rubber tissue if, and as required in the original proposal, they shall be supplied by the War Department or as otherwise specified. The female coupling shall be properly fitted with a rubber washer supplied by the hose manufacturer, cut from a rubber tube of the same composition as the hose tube, unless otherwise specified.

(*c*) BELTING.—Rubber and balata belting shall be made of cotton duck, properly impregnated according to standard manufacturing practice, and be of the number of plies and width specified.

(*d*) PACKING.—Rubber packing shall have comparatively smooth surfaces, be free from pitting, and of uniform thickness. All rubber packing to be furnished in rolls weighing approximately 125 pounds.

(*e*) MOLDED AND LATHE-CUT GOODS.—All molded goods shall be of dimensions specified, free from surface imperfections, air checks, and pits.

BRANDING.

All branding and stenciling shall contain the words "U. S. A., ..." (blank to be filled in with such words as may be designated in the detailed specifications), manufacturer's name, and date.

(*a*) HOSE.—All wrapped hose 25 feet or over in length shall have red (unless otherwise specified) brands inlaid in the rubber cover at two places on each length, approximately four feet from the ends, letters to be at least ¼-inch high; hose less than 25 feet in length shall have one inlaid brand approximately in the center, unless otherwise specified.

(*b*) BELTING.—On the seam side of all belting over 4 inches in width, brands shall be inlaid in red rubber at least every 30 feet in letters at least ¼-inch high. For belting 4 inches and under, the same words shall be stenciled in letters 1 inch high. All balata belting shall be branded with stencil only.

(*c*) PACKING.—All packing shall be stenciled in letters at least 1 inch high every fifteen feet for rolled packing and at least once on each sheet of asbestos compressed packing.

(*d*) MOLDED AND LATHE-CUT GOODS.—Molded and lathe-cut goods shall be branded as in detailed specifications.

MATERIALS.

(*a*) COTTON REINFORCEMENTS:

WRAPPED HOSE, BELTING, AND PACKING.—The cotton fabric layers shall be well, evenly, and firmly woven from good cotton, as free from unsightly defects, dirt, knots, lumps and irregularities of twist as is consistent with the best manufacturing practice and conform to requirements of detailed specifications.

BRAIDED HOSE.—Cotton braided layers shall be of such nature as to meet tests specified.

(*b*) RUBBER:

Rubber compounds shall in all cases be properly vulcanized and meet the requirements as specified.

When fine Pará is specified it is understood to include only such grades of plantation *Hevea* rubber, as by virtue of their physical and chemical characteristics, are practically equivalent to fine pará in its performance.

Where sulphur limits are specified, mineral fillers may contain barytes, but shall be practically free from sulphur in other forms and from any substances tending to have a deleterious effect on the finished product. The sulphur in barytes shall not be included in the allowable sulphur content.

All percentages shall be based upon the weight of total rubber compound.

INSPECTION AND REHEARING.

Inspection and tests shall be made at place of manufacture unless otherwise specified, manufacturer providing a place for conducting test; also necessary help, gages, equipment, etc. In case it is not practicable to obtain suitable test specimens, the manufacturer shall furnish pieces ⅛ by 1½ by 8 inches, which he guarantees to be of the same material and equivalent cure as that used in article furnished.

Inspector shall, after tests, mark the remainder of samples with manufacturer's name, order, requisition, and item numbers and forward them to the properly designated organization for any further tests. Any lot which in any one or more tests proves unsatisfactory shall be retested by taking two additional samples which shall be at the expense of the contractor. Failure of either in any respect shall be cause for rejection.

No rehearing may be had on any rejected material unless by authority of the proper organization.

(*a*) HOSE.—Inspector may select three lengths at random from each and every shipment of 5,000 feet or less. A 3-foot section shall be cut from each length so selected for burst, after which further physical tests shall be made on the same sample, unless otherwise specified. Manufacturer shall refit couplings to said lengths which shall be accepted as full lengths provided they conform to specifications. When hose is furnished in lengths under 10 feet, extra lengths shall be furnished for test purposes at contractor's expense.

(*b*) BELTING.—Inspector may take a test sample 12 inches long from any part of each roll of belting, 4 inches and under in width; 4 inches long from belting over 4 inches in width.

(*c*) PACKING.—Inspector may select at random one test sample 10 inches long, cut across the full width of roll or sheet, from every lot of approximately 250 pounds.

(*d*) MOLDED AND LATHE-CUT GOODS.—Inspector may select at random one piece out of every 200 or less for tests.

TESTS.

All tests on material as a whole and on individual parts shall be performed according to methods adopted by the National Bureau of Standards as outlined in their circular No. 38, "Testing of Rubber Goods," in effect at date of opening of proposal.

Hydrostatic and tensile tests shall be in pounds per square inch. All samples which are subjected to a steam, oil, or aging test shall rest 24 hours before test specimens are cut.

(*a*) FABRIC.—The tensile strength shall be obtained by cutting strips from fabric 6 inches long, 1¼ inches wide and unraveled from each side to a width of 1 inch. Jaws of testing machine shall be more than 1 inch wide and 3 inches apart, separating at the rate of 12 inches per minute. Results obtained by taking the average of three tests each on both warp and filling shall be accepted as the tensile strength of the fabric. The tests shall be made when practicable after conditioning the fabric in an atmosphere having a relative humidity of 65 per cent and a temperature of 70 degrees F. for two hours. When not practicable to test as above, the fabric may be tested under existing humidity conditions and results corrected to a 6 per cent moisture basis by multiplying by the following factor:

$$\frac{100}{100 \text{ plus } 7 \times (\text{per cent moisture} - 6)}$$

NOTE.—The factor will be less than unity when the per cent moisture is greater than six and vice versa.

Moisture shall be determined by weighing six samples together before testing, and tensile strength immediately obtained in rapid succession. The broken samples (entire) after rupture shall be placed in a ventilated drying oven at 105 to 110 degrees C. (221 to 230 degrees F.) until weight is constant. Moisture present shall be calculated on this basis of the bone dry sample.

All fabric weights are given in ounces per square yard and shall be calculated on a 6 per cent moisture basis. Tolerance 3 per cent plus or minus.

(*b*) HYDROSTATIC TESTS.—To insure proper attachment of couplings when furnished with hose, pressure shall be held for three minutes on each length of hose; piece under test must not leak, sweat nor rupture the cotton canvas layers.

Bursting tests shall be made on samples 3 feet long, pressure being raised at rate of 300 pounds per minute.

(*c*) FRICTION TESTS.—Wherever practicable all tests shall be made on an automatic friction testing machine; ply separation being 1 inch per minute. Except in rubber-lined cotton hose, width of test specimen shall be 1 inch. In all cases strength of friction shall be the average value obtained on each test, and be given in pounds.

(*d*) RUBBER.—Longitudinal specimens shall be taken on hose and tubing under 1½ inches inside diameter; transverse specimens on all others..

Test specimens shall be buffed smooth to approximately not more than ⅛-inch in thickness and cut with a standard die having a constricted part ½ by 2 inches, unless otherwise specified. Tests shall not be made until sufficient time has elapsed for rubber compound to recover from stretching or handling.

AIR BRAKE AND SIGNAL HOSE AND GASKETS.

War Department Specification No. 333-1-3—June 5, 1919.

(A) AIR BRAKE HOSE. (B) AIR SIGNAL HOSE. (C) AIR BRAKE AND AIR SIGNAL HOSE GASKETS.

GENERAL.—(*a*) This specification covers the requirements for air-brake, air signal hose, and gaskets.

(*b*) See War Department Specification No. 333-1-1, headed General Specification for Mechanical Rubber Goods, which is made a part hereof, except in such cases as the provisions below directly conflict. In such cases the word and meaning of this specification will govern.

CONSTRUCTION.—See General Specifications.

(*a*) Dimensions to conform to the table below.

(*b*) Cotton canvas layers shall be applied on a bias of from 42 to 46 degrees.

(*c*) Hose to be capped with same rubber compound as tube.

(*d*) Each length properly fitted with Master Car Builders' (MCB) standard air-brake or air signal couplings, if specified.

(*e*) If coupled, coupling shall be put in end near which brand is located.

(*f*) Gaskets must be uniform in size and section and of dimensions conforming to figure 1.

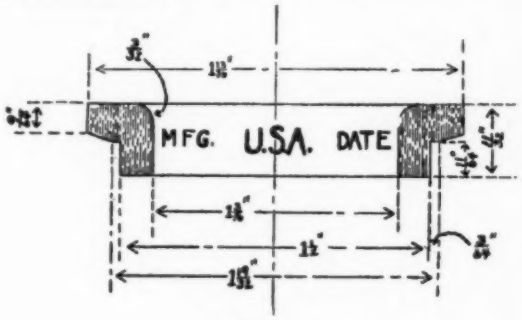


FIG. I.

BRANDING.—See General Specifications.

(*a*) HOSE.—A 1-inch side label shall be applied 6 inches plus or minus ½-inch from one end of base with the top of lettering toward the center of the hose. Use the words, "Airbrake" on air brake hose; and the words "Air Signal" on air-signal hose.

(*b*) GASKETS.—See Figure I.

MATERIALS.—See General Specifications.

(*a*) The fabric shall be made of long-staple cotton having not less than 16 nor more than 22 threads of 5-ply yarn per inch, each in warp and filling, and weighing not less than 19.8 ounces per square yard.

(*b*) Gaskets shall be made of such a compound that they will be tough and yet have enough elasticity to conform to the requirements for strength and elongation.

INSPECTION.—See General Specifications.

(*a*) Inspector may take one length at random from each shipment of 200 lengths or less of hose, from which he shall cut a 5-inch section. Two 1-inch sections shall be cut from this 5-inch piece for making friction, stretching, and tensile tests; the remaining 3-inch section shall be used for making additional tests which may be desired on the tube and cover.

(*b*) Inspector shall examine such lot of gaskets for size and workmanship, and shall take samples therefrom for tests.

TESTS.—See General Specifications.

(*a*) HOSE.

1. See the following table.
2. Test samples not to be buffed.
3. Stretching test.

Test specimens from tube and cover will be quickly stretched until the 2-inch marks are 10 inches apart and immediately released. They will then be remarked as at first within 10 seconds after starting to release and again stretched to 10 inches between the new marks, remaining stretched for 10 minutes. The specimens shall then be completely released, and within 30 seconds after starting to release the distance between the marks last applied will be measured, and the initial set shall not be more than ¼-inch. At the end of 10 minutes the distance between the marks will again be measured, and the final set shall not be more than ⅛-inch. These test specimens may be cut from the tube and cover of the friction test specimen, but shall not be used fgr tensile test.

POROSITY TEST.

The remaining 17 inches shall be mounted and placed in a test rack, the circumference will be measured and the hose filled with air at 140 pounds pressure per square inch, the rubber cover shall be cut from clamp to clamp (taking care not to injure the duck) and this pressure maintained for five minutes. At the end of this time the hose will be submerged in water to determine whether the inner tube is porous. The escape of air through the tube shall be distinct enough so that the porosity will not be confused with the escape of air which is confined in the structure of the hose. In the event the hose fails on bursting test at the point at which cut was made for porosity test and a satisfactory hydraulic test is not obtained, the porosity and hydraulic test will be repeated on another piece of hose.

The section of hose which was used for porosity test shall also be used for the hydraulic tests.

If the tensile strength in pounds per square inch is greater than that required, the sample may be accepted providing the per cent increase in elongation is equal to or greater than the per cent increase in tensile in pounds per square inch above the maximum figure.

(*b*) GASKET.

DEFLECTION TEST.

Gaskets shall be subject to a deflection test which shall consist of suspending a weight of 20 pounds on the gasket. Under this load the increase in inside diameter shall not be more than ⅜ inch, the measurement to be taken on the inside of the gasket with the load applied, and within 15 to 20 seconds after the application of the load. support, and the hook to which the weight is attached, shall have a diameter of ¼ inch.

TENSION TEST.

When the samples for test are received they will be examined for size and workmanship. The gaskets will be tested in tension in a manner similar to that of the tensile test of a single link of a chain. The half-links used to pull on the gasket will each be provided with 180 degrees fillet of the same diameter as the original inner diameter of the gasket—that is, the two semi-circular fillets of the pulling links will just fill the inside of the gasket. They should sustain an ultimate load of 100 pounds and show an elongation of original diameter of 350 per cent when tested as described above.

REJECTION LIMITS.

If any of the sample gaskets representing a lot should fail under a load of less than 90 pounds, or if the elongation is less than 200 per cent, the entire lot represented by the sample will be rejected. If the tensile strength of any sample tested is more than 125 pounds the lot will be rejected, unless the elongation obtained from such samples is more than 275 per cent.

TABLE.		AIR-BRAKE.	AIR SIGNAL.
Size, minimum	inches	1⅜	1⅜
Inside diameter, maximum	inches	1 7/16	1 7/16
Outside diameter, minimum	inches	2 7/16	1 13/16
Outside diameter, maximum	inches	2⅛	1⅞
Length, minimum	inches	22	22
Length, maximum	inches	22½	22½
Thickness:			
Tube minimum	inch	9/32	9/32
Cover, minimum	inch	7/32	7/32
Cap, minimum	inch	1/32	1/32
Cap, maximum	inch	9/32	9/32
Porosity test, minimum	pounds	140	140
Hydrostatic tests:			
Expansion test—			
Pressure, minimum	pounds	200	200
Increase in circumference, maximum	inch	¾	11/16
10-minute test without bursting, minimum	pounds	500	500
Bursting, minimum	pounds	700	700
Tensile:			
Tube, minimum	pounds	800	800
Tube, maximum	pounds	1,200	1,200
Cover, minimum	pounds	700	700
Cover, maximum	pounds	1,100	1,100
Ultimate elongation, tube and cover, minimum	inches	2-10	2-10

STEAM HOSE.

War Department Specification No. 333-1-11—June 5, 1919.

GENERAL.—(*a*) This specification covers the requirements of

hose for general use in conveying steam or hot water under pressure; also for car heating purposes.

(*b*) See War Department Specification No. 333—1—1, headed General Specification for Mechanical Rubber Goods, which is made a part hereof, except in such cases as the provisions below directly conflict. In such cases the word and meaning of this specification will govern.

CONSTRUCTION.—See General Specifications.

(*a*) DIMENSIONS.—See the following table.

(*b*) No washers to be furnished.

BRANDING.—See General Specifications.

(*a*) Use the word "Steam."

MATERIAL.—See General Specifications.

INSPECTION.—See General Specifications.

(*a*) Inspector may select four lengths at random from each shipment of 100 lengths or less, and cut from each length selected a 3-foot section; two sections for steaming and the others for remaining tests.

TESTS.—See General Specifications and following table.

(*a*) Test specimens shall not be buffed.

(*b*) STEAMING.—The ultimate tensile strength shall be determined by using the original thickness of samples in calculating the area. When calculating the tensile strength after steaming the test piece shall be considered as having the same thickness as that used before steaming.

A sample not less than 18 inches long shall be subjected to dry saturated steam in a digester for a period of 48 hours at a pressure of 45 pounds. After this test, the tube and cover shall not show any blisters, nor loosen from the plies of fabric. After resting, test piece shall be cut at least 4 inches from end and shall meet the figures indicated in the following table:

SIZE (I. D.)	½ INCH.	1 INCH.	1½ INCHES.	1¾ INCHES.	1¾ INCHES.
Outside diameter ....inches	1⅝	1¹⁵⁄₁₆	2⅜	2¹¹⁄₁₆	2¹⁵⁄₁₆
Tolerances:					
I.D., plus or minus..inch	1/64	1/64	1/64	1/64	1/64
O.D., plus or minus..inch	1/16	1/16	1/16	1/16	1/16
Thickness:					
Tube, minimum .....inch	1/8	1/8	1/8	1/8	1/8
Cover, minimum .....inch	3/32	3/32	3/32	3/32	3/32
Length, as specified in proposal.					
Tests:					
Hydrostatic—					
Coupling, minimum..lbs.	200	200	200	200	200
Burst, minimum...lbs.	800	800	800	700	700
Friction—					
Before steaming minimum .....lbs.	20	20	20	20	20
After steaming minimum .....lbs.	15	15	15	15	15
Tensile, minimum—					
Tube, before steaming lbs.	600	600	600	600	600
Tube, after steaming, lbs.	450	450	450	450	450
Cover, before steaming, lbs.	600	600	600	600	600
Cover, after steaming, lbs.	450	450	450	450	450
Ultimate elongation, tube and cover—					
Before steaming, minimum ....inches	2-6	2-6	2-6	2-6	2-6
Before steaming, maximum ....inches	2-10	2-10	2-10	2-10	2-10
After steaming, minimum .....inches	2-5	2-5	2-5	2-5	2-5
After steaming, maximum .....inches	2-9	2-9	2-9	2-9	2-9

(*To be continued.*)

Detection and Determination of Glue in Rubber Goods.[1]

By S. W. Epstein and W. E. Lange.

GLUE is one of the latest additions to the long list of materials which have found application in rubber compounding. Its use has been attended with such striking success that it is becoming more and more prevalent in rubber stocks. As a consequence, the rubber analyst has another organic constituent to contend with in the determination of rubber hydrocarbon by difference. In order to be able to rely upon the figure for rubber hydrocarbon in a rubber mixing, it is necessary to know whether or not glue is present and when it is, the quantity must be determined.

The use of glue in rubber is such a comparatively recent thing that up to the present its detection and determination have received little attention. After one has found out that it is impossible to extract the glue from a cured rubber stock by means of boiling water, the problem of finding a satisfactory method takes on a formidable aspect. The problem presented two angles from which it could be attacked, namely: (1) by dissolving away the rubber and leaving the glue unchanged so that it could be dissolved in water and the glue determined by the weight of the water extract; (2) by determining the nitrogen content and calculating this to glue by means of the factor 5.56.

Believing that a Kjeldahl determination is too long for ordinary laboratory practice, we undertook to dissolve the rubber and attempted to get the glue in the residue. We found that the nitrosite and bromine methods of converting rubber into a soluble derivative could not be used since the glue seemed to be acted upon. The residue, which was left after the removal of the rubber compounds, when extracted and digested with hot water, gave extracts which contained less than 50 per cent of the total glue present; in addition, this water solution would give none of the tests which are used to detect the presence of glue.

We next directed attention to rubber solvents, especially to those which would dissolve rubber at comparatively low temperatures, since a high boiling solvent decomposes the glue and is therefore inapplicable. After considerable experimentation it was found that cresol seemed to be satisfactory for the purpose. Rubber can be dissolved in it and the resulting solution, after it has been diluted with petroleum ether, can be filtered with ease. When glue is treated with cresol, it dissolves very readily but is precipitated in large part from this solution on the addition of petroleum ether. Experiments showed that on the average about 70 per cent of the glue could be precipitated from its cresol solution. The precipitation, therefore, could not be used as a quantitative procedure for a glue determination. However, this precipitate settled out very well and dissolved readily in water, giving a solution which answers all the tests for glue and the procedure can be used as the basis of a qualitative test for glue in rubber "mixings."

QUALITATIVE METHOD.

About 0.5-gram of the rubber sample to be tested for the presence of glue is digested in 25 cc. of freshly distilled cresol (boiling point 195 degrees C.) in a tall beaker for about 16 hours at 120 degrees C. This digestion is conveniently carried out by placing the beakers in a properly regulated Freas oven and allowing them to remain there over night. The cresol solution is allowed to cool and 250 cc. of petroleum ether is added slowly with constant agitation. When this solution has settled and the supernatant liquid is clear it is filtered through a Gooch crucible, using gentle suction. The beaker, contents and crucible are washed thoroughly with petroleum ether, then with hot benzol. The pad is removed from the crucible, placed inside of the beaker and digested

[1] Published by permission of the Director of the Bureau of Standards, Washington, D. C.

for several minutes with boiling water. The solution is filtered through a folded filter paper and evaporated to a volume not to exceed 150 cc. After it has cooled it is poured very slowly into a 5 per cent solution of pure tannic acid. In the presence of glue a cloudiness will appear at first and finally a precipitate as more of the glue solution is added. Large percentages of glue give heavy curdy precipitates while small quantities give decided cloudiness. In the absence of glue no permanent precipitate or cloudiness will appear in the tannic acid solution as the liquid is added to it.

In order to test the reliability of this qualitative procedure in detecting varying quantities of glue, mixings were made up which contained from 0.9 per cent to 10.0 per cent of glue, the balance of the compound being rubber (40 per cent), zinc oxide, magnesium oxide, gas black, mineral rubber and sulphur. They were run through the above procedure with the following results:

PERCENTAGE OF GLUE.	APPEARANCE OF THE SOLUTION ON ADDITION TO TANNIC ACID.
0.00	Solution remains perfectly clear. No cloudiness.
0.9	Distinctly cloudy.
1.7	Cloudiness much denser than the above.
2.6	Cloudiness almost opaque. Precipitate.
3.5	Absolutely opaque. Precipitate.
4.3	Fairly heavy precipitate.
6.3	Heavy precipitate.
8.0	Very heavy precipitate.
10.0	Very heavy precipitate, which showed its curdy character very plainly.

The observations given above demonstrate conclusively that even the smallest practicable amount of glue can readily be detected by means of the procedure recommended here.

Many experiments were carried out in order to ascertain whether ingredients other than glue would dissolve in water and precipitate the tannic acid solution and in this way be mistaken for glue. It was found that magnesium oxide and calcium oxide dissolve to a considerable extent in hot water after they have been treated with cresol and the water solution that is obtained precipitates tannic acid when the reagent is not in excess. However, these precipitates are readily soluble in excess of tannic aid, while the glue-tannate precipitate is insoluble. Therefore it was recommended in the method given above that the solution to be tested for glue be added to the 5 per cent tannic acid solution. In this way the magnesium and calcium precipitates will be dissolved immediately as they appear and will become permanent only when a considerable quantity of their solutions has been added. In this way there will be no chance of mistaking them for glue since the glue precipitate will appear immediately and will be permanent, even when only a small quantity of its solution has been added. We have been unable to find anything else which would be present in this solution and would give a permanent precipitate when added to tannic acid. There is therefore no danger of misinterpreting the tannic acid precipitate; when it is obtained the presence of glue in the rubber mixing cannot be questioned.

QUANTITATIVE METHOD.

However, since the method is not quantitative, after the presence of glue has been proved, its amount must be determined. The only means we have found by which this can be done is to determine the nitrogen by the Kjeldahl procedure and calculate the amount of glue from it. This was found to be satisfactory and results were obtained which were usually 0.1 per cent to 0.2 per cent higher than the true value. The method is practically the same as that followed out in most laboratories. It is as follows:

Extract a two-gram sample with acetone for six hours, and then with chloroform for three hours and dry. Transfer the sample to a 750-cc. Kjeldahl flask. Add 25 to 30 cc. of concentrated sulphuric acid, 10 to 12 grams of sodium sulphate, and about one gram of copper sulphate. Place the flask on the Kjeldahl digesting apparatus, and heat gently until the first vigorous frothing ceases, then raise the heat gradually until the liquid boils. Continue the boiling until the solution becomes clear. Allow the flask to cool to 40 degrees to 60 degrees (If allowed to become thoroughly cold the solution solidifies); dilute carefully with 150 cc. of water; allow to cool. Add 100 cc. of 50 per cent sodium hydrate solution, pouring it carefully down the side of the flask, so that it does not mix immediately with the acid solution. Add about one gram of granulated zinc to prevent bumping, and a piece of paraffine the size of a pea to diminish frothing. Connect the flask quickly with a condenser, the delivery tube of which dips into a 500-cc. Erlenmeyer flask, containing 50 cc. of tenth normal sulphuric acid, diluted to about 100 cc. Shake up the Kjeldahl flask and heat gently at first, increasing the flame as the danger of foaming over diminishes, finally boiling briskly until about one-half of the liquid has passed over into the receiver. Add one cc. of methyl red solution, and titrate the excess acid by means of standard sodium hydrate solution.

Calculation:

$$\frac{100\ (\text{cc. } H_2SO_4 \times \text{normality} - \text{cc. NaOH} \times \text{normality}).\ (0.014 \times (5.56)}{\text{Weight of sample}} = \text{Percentage glue.}$$

When light-gravity stocks are analyzed as above, inexperienced manipulators may not find glue when it is present. Such stocks float on the surface of the acid and allow the glue to be driven off by the heat before the nitrogen in it has been converted into ammonium sulphate and therefore no ammonia will be obtained. This difficulty can be overcome by constant agitation of the flask so that the rubber is kept moistened with acid until it is attacked. This laboratory has found it very convenient to add a small quantity of bromine to the rubber, which makes a brominated mass that sticks to the bottom when the acid is poured over it. There is therefore no danger of driving off any of the glue and the constant agitation and attention otherwise necessary can safely be dispensed with.

CONCLUSIONS.

1. The method presented will detect as little as 0.9 per cent of glue in a rubber mixing. It has been found, by experiment, that no substance other than glue will answer to this test when it is carried out as directed, and the method is reliable and convenient.

2. When glue is present in a rubber sample its quantity is arrived at by determining the nitrogen content by means of the Kjeldahl procedure and calculating this to glue. We have been able to find no other satisfactory quantitative method which would give the correct percentage of glue.

THE ADVANTAGES OF RECORDING THERMOMETERS.

As an illustration of what can be accomplished by watching results, the story is told of a large factory that had two vulcanizing departments in one of which an installation of six thermometers on the vulcanizers gave greatly improved results. In the other mill there were twelve vulcanizers, but because of some difficulty with the vulcanizer man, the superintendent hesitated to put in thermometers. Finally the man was induced to try one out, and after a short trial he equipped all his vulcanizers, and said that he wondered how he had gotten along without them. In explanation he stated that before he had recording thermometers installed, if a heat came out badly he would have to spend two or three days and sometimes nights personally investigating before the cause was discovered. But, with the recording thermometers, he first looked at the chart records and if these agreed with the predetermined temperature he knew that something was wrong with the mixture. Thus he was enabled to put his finger on the trouble at once and correct it without waste of time and without overmuch damaged material.

What the Rubber Chemists Are Doing.

AGING EXPERIMENTS ON VULCANIZED PLANTATION PARA RUBBER.

CAPTAIN B. J. EATON, F. I. C., AND F. W. F. DAY of the Experimental Vulcanizing and Chemical Laboratory, Agricultural Department, Federated Malay States, have reported their investigations on the aging changes which take place in vulcanized Pará rubber, of which the following is a condensed account:

Preliminary investigations were made as a guide to a systematic examination of aging phenomena by experimenting on samples of rubber which had been considerably overvulcanized, since the changes would be emphasized in such samples and would be accelerated.

These samples consisted of "slab" rubber (coagulum matured for at least six days before machining to crêpe and crêpe rubber. The samples were prepared under comparable conditions and mixings containing ten per cent of sulphur and 90 per cent of rubber were prepared and cured at 140 degrees C. for varying periods of excessive cure. It was discovered, however, that no useful deductions could be drawn from the figures obtained owing to the remarkable increase in weight which occurred in the crumbled samples after storage, this is, on aging. These large increases in weight were not followed up in these preliminary experiments. The results indicated that much overcured samples would give even greater increases over similar periods.

As it was practically certain that the increases in weight were due to oxidation, the presence of substances soluble in water was tested by extraction of the samples in boiling water and the percentage of extract (by difference), the percentage of sulphur in the form of sulphate, and the total acidity of the extract of sulphuric acid were determined in terms of sulphur. The extraction with water was followed by extraction with acetone in order to obtain the free sulphur content and the additional matter extractable by acetone. A remarkable percentage of matter extractable by water was formed during the aging. The amount of sulphur present as sulphates in the aqueous extract was also marked. The acetone extract contained substances other than the sulphur and the resin which would be present in the original raw rubber (which ordinarily amounts to 2.3 per cent).

No further deductions can be drawn from the results since the increases in weight of the samples had not been determined. Some of these increases are nearly 40 per cent, which would bring the total sulphur content of the samples, calculated on original weight, up to about nine per cent, which still indicates an actual loss of sulphur on aging.

SCHEME OF EXPERIMENT.

As a result of the preliminary experiments mentioned above it was decided to trace the changes, due to aging, in the combined sulphur content, and the aqueous and acetone extracts, after making allowances for the oxidation or other changes in weight. For this purpose, two sets of about ten grams of crumbed rubbers were stored in specimen tubes. The first set was used to provide samples for analysis at different periods, while the second set was weighed at intervals but not otherwise disturbed. In addition, two grams of each crumbed rubber were left on watch-glasses and also weighed at intervals, as it was thought that aging (as indicated by increase in weight) would proceed more rapidly in the case of crumbs exposed to the air and under different conditions from those packed in closed tubes.

Further, eight-gram disks about five millimeters thick and 44 millimeters in diameter were also exposed in small watch-glasses. These were used in order to retain any sulphur exuding on the surface due to the well known "blooming" of vulcanized rubber.

INCREASE IN WEIGHT ON STORAGE.

During the first ten days a slow increase in weight took place in all the samples, after which period the factors favoring a rapid increase are: (*a*) overcuring of the rubber; (*b*) freedom from complete exposure to the air. The most rapid increase was shown by the most overcured sample exposed on a watch-glass.

A similar relationship holds good between the tube stored and watch-glass stored samples for each pair of samples. In every instance the increase in weight of the tube stored samples overtook those of the watch-glass stored samples after periods ranging from one to two and one-half months, the period increasing according as the overcuring of the sample is less. Comparing the cures obtained by plotting the data from these samples shows that excessive overcuring appears to be the principal factor affecting the type of curve In the case of watch-glass stored samples the tendency to keep below the tube stored samples for an indefinite period, that is, to gain weight more lowly, was very marked.

It seems clear that the explanation lies in the fact that while increases in weight are proceeding uniformly in both sets of samples, a loss of weight is proceeding at the same time in the freely exposed samples, which leads to an apparent retarded increase.

Results from four samples investigated indicated that overcuring beyond a certain point ceases to increase the capacity of a rubber to gain weight during storage, and warrants the assumption that excessive overcuring does actually decrease the capacity of aging as measured by weight increase.

COMBINED SULPHUR CONTENT.

Only the much overcured crumbled samples showed combined sulphur changes on aging. Normally cured samples did not show much variation in this respect, although some changes could be traced. These changes were, however, small and irregular.

It was noticed generally that the color changes of the samples of stored crumbs which took place were greatest in those portions in contact with the sides of the tubes, that is to say, the portions exposed to light. The central portion or core of the tube-stored crumbs appeared to be unaffected in the undercured samples. The overcured samples, however, broke down to a powder. Probably, therefore, if given sufficient time, the full aging effect of 40 per cent increase in weight would develop in all the samples.

From a study of the changes in sulphur content and weight it is evident that very complex changes are proceeding in which the loss of sulphur compounds at one time exceeds, proportionately, the loss of other constituents. It is also clear that at a later stage the conditions are reversed, leading to an increase in sulphur content, and throughout the whole period of change a steady gain in weight, due presumably to oxidation, is taking place.

AQUEOUS AND ACETONE EXTRACTS.

Some idea of the changes in the proportions of sulphur soluble in water and in acetone can be obtained by extraction in boiling water and acetone. Close analysis of the results is impossible, owing to the weight increases, and it is not possible to eliminate the effect of these changes. The results show that complex changes are occurring which it is impossible to examine at this stage of the work.

CONCLUSIONS.

It is not yet possible for the authors to draw very definite conclusions, since the changes taking place in vulcanized rubber on aging are obviously complex. They have placed their results on record because the literature on this subject does not appear

[1] "Journal of the Society of Chemical Industry," September 15, 1919, page 339T.

to contain any results similar to those they have obtained in respect of (1) the large increases in weight on storage, (2) the formation of a large aqueous extract in the samples, and (3) the conversion of the sulphur to a large extent into aqueous soluble compounds.

PRACTICAL SYNTHETIC RUBBER.

The practical manufacture of synthetic rubber in Germany under war conditions is described in *"Gummi-Zeitung,"* July 11, 1919, page 750. The most available source was found to be calcium carbide, from which methyl rubber was produced from acetone in accordance with the following procedure:

SYNTHESIS OF RUBBER.

The acetylene gas produced from calcium carbide and water changes in the pressure of contact bodies by the addition of water into acetaldehyde. This is oxidized with acid into acetic acid, which is separated into acetone by elimination of carbonic acid by blowing over a contact substance. This liquid is diluted with benzol and under proper conditions is reduced in the presence of aluminum scrap into pinacone, a crystalline substance of 42 degrees C. melting point and 170 degrees C. boiling point.

After reduction the mixture is diluted with water and distilled. Any undecomposed acetone-benzol mixture is first removed and later parted by separate distillation. Only on further distillation are these converted into oils, boiling at a higher temperature, most of which contain pinacone. These higher boiling oils are treated with water, whereupon pinaconehydrate appears as a white crystalline product. This is then treated with acid salts on free acid to obtain dimethyl butadiene having a boiling point of 70 degrees C. and is freed by fractional distillation from the by-product pinacoline, a mixed ketone boiling at 106 to 120 degrees C. The dimethyl butadiene is placed in vessels where by the addition of a small quantity of a catalyzer it is polymerized into methyl rubber. The total amount of methyl rubber obtainable from acetone is about 40 per cent.

COMMERCIAL VARIETIES.

Methyl rubber was produced by the *Farbenfabriken*, Elberfeld, in two qualities, one designated as "H" and the other as "W." The H variety results from cold polymerization (about 35 degrees C.) and is adapted to the manufacture of hard rubber, while the W variety results from warm polymerization (about 70 degrees C.) and is suitable for making soft rubber goods.

PROPERTIES AND DEFECTS.

Both sorts of synthetic rubber require a long time for polymerization, the H three and one-half months and the W as long as five months. Neither form is stable but oxidizes readily in the air as soon as formed; consequently a preservative agent is required to prevent this. At first, aldehyde ammonia was used, next piperidine, followed by experiments with other agents. At the same time a vulcanization acceleraator is incorporated.

On account of their instability these rubbers are shipped in tightly closed zinc-lined iron containers.

H SYNTHETIC RUBBER.

More of the H grade is used than of the W. It is yellowish in color and very dry and stiff because the masses are heavily pressed together, expelling the air from the interior to secure protection against oxidation. The characteristic properties of extensibility and toughness which mark natural rubber are present in much less degree in methyl rubber. The latter crumbles at first on the mill almost completely and reunites into a sheet only after prolonged milling.

The milled rubber becomes capable of taking up compounding ingredients only after an hour of milling. Likewise, long milling is found necessary to eliminate porosity and secure solidity in molded work. The milling should take place only on moderately warm mills. Under hot milling, H rubber becomes sticky. In order to increase its capacity to absorb filling materials it is found advisable to wash the rubber thoroughly. It then becomes necessary to dry it completely at low temperature to avoid oxidation and conversion of the rubber into a dark sticky mass in which condition it is not suited to vulcanization and produces only porous products. Washed and dried H rubber is even softer and more elastic after vulcanization than products made from the same rubber unwashed.

When heated in the air to its melting point, H rubber oxidizes and the rubber molecule breaks down, as inferred from the fact that when similarly heated at considerable temperatures in inert gases such as nitrogen, carbonic dioxide, and sulphuretted hydrogen this effect is not observed.

To increase the ability of the rubber to absorb compounding ingredients the *Farbenfabriken*, Elberfeld, recommends the addition of a certain percentage of their ER solution or from five to ten per cent of pinacoline. The addition of a small amount of reclaimed rubber permits the more ready absorption of large quantities of mineral ingredients.

To increase the elasticity of synthetic rubber a number of minerals are recommended such as diphenylamine, diamethylaniline and toluidine.

The chief accelerator employed is the preparation known as Vulcacit. This material also acts powerfully in the acceleration of the cure of natural rubber.

The W variety of methyl rubber is much darker than the H grade. It is reddish brown in color. In structure it is net-like and is strongly suggestive of natural rubber. On the mill rolls it is tough and would readily be mistaken for natural rubber. It differs, however, by reason of its internal stickiness. On its torn edges it presents fine silk-like threads. While both grades are suitable for mold work the W grade is not so readily moldable as the H grade. In the case of plied up articles extra pressure must be used during the vulcanization to insure adhesion of the component parts.

NATURAL AND ARTIFICIAL RUBBER.

The investigation of A. Tschirch on the constitution of natural and artificial rubber has been published in *"Schweitzer Chemiker Zeitschrift,"* 1919, pages 153-156. In abstract his results are as follows:

The term rubber covers a variety of raw materials. Those of African origin furnish colloidal solutions with chloroform, whereas *Hevea* and *Manihot* rubbers are only slightly soluble. though they swell up considerably in that solvent. The term "synthetic" rubber is incorrect because the synthesis is confined to a single constituent which the author designates as "caoutchougutta," a mixture of hydrocarbons in various forms and in varying quantity in one and the same kind of rubber.

The substance known as synthetic rubber is not identical with the caoutchougutta of the natural article. Natural rubber is by no means the unaltered sap of rubber plants. It contains protolactoretin, and undergoes alteration shortly before it exudes into the air, further changes ensuing during coagulation and smoking. Protolactoretin is a polymer of isoprene, and is not the same in all rubber plants. Commercial rubber is regarded by the author as a semi-manufactured article rather than a natural product.

According to the author, synthetic rubber is analogous to Pará rubber, the artificial caoutchougutta being derived from aliphatic hydrocarbons (mythylated butanes). The varying solubility of rubbers probably may be due to the structural conditions of the colloid substance. Rubber occupies an intermediate position between the emulsoids and the dispersoids, and is heterogenous, containing at least two structural phases, a solid colloidal solution. Under the microscope Pará rubber that has been extracted with chloroform is seen to consist of a fine network of minute straight and bent rods, forming the turgescent component, which, however, in the case of extracted synthetic isoprene rubber, is irregular and not reticulated.

The author considers that the peculiar structure of Pará rubber is the cause of its superiority to synthetic and the other natural rubbers. A feature common to both Pará caoutchougutta and that from synthetic isoprene rubber is the presence of a constituent (A-caoutchougutta) soluble in chloroform, and a second (B-caoutchougutta) insoluble but turgescent in that solvent, this second constituent acting as a solvent of the first and forming the reticulate structural component. Methyl rubber contains no turgescent component and dissolves slowly and completely to a viscous, clear colloidal solution in chloroform. Great stress is laid on the nature of the turgescent component as an indication of the technical value of rubber. The proportion of this component is lowered by the process of mastication.

CHEMICAL PATENTS.

THE UNITED STATES.

PROCESS OF RECOVERING PLASTIC RUBBER FROM FABRICS which consists in progressively disintegrating the fabric in presence of water and simultaneously stripping the plastic rubber from the fabric and from the threads and fibers resulting from its disintegration. (Theodore F. Furness, Cynwyd, Pa., assignor by mesne assignments to Acushnet Process Company, New Bedford, Mass. United States patent No. 1,321,200.)

PROCESS FOR RECLAIMING RUBBER AND COTTON FROM RUBBER WASTE which comprises the steps of wetting the waste, passing it between rollers whereby the waste is formed into a sheet, and feeding such sheet gradually to a high speed picker causing the fabric to be torn from the sheet in the form of threads and fibers while the rubber is torn from the sheet in small balls and particles. (Philip E. Young, Fairhaven, Mass., assignor to Acushnet Process Company, New Bedford, Mass. United States patent No. 1,321,201.)

RECLAIMING RUBBER.—In the manufacture of rubber a method which consists in adding proteid to a fresh rubber stock prior to the vulcanization thereof, vulcanizing the fresh product, reclaiming the vulcanized product and revulcanizing the reclaimed product. (Clayton W. Bedford, assignor to The Goodyear Tire & Rubber Co., both of Akron, Ohio. United States patent No. 1,321,501.)

RUBBER SUBSTITUTE.—The process and product which consists in combining fish oil and sulphur in the presence of heat and resubjecting the resultant combination to heat under pressure. (Morton Gregory, assignor to Western Rubber Co., both of Tacoma, Washington. United States patent No. 1,321,788.)

PROCESS FOR DEVULCANIZING RUBBER.—Comprising boiling rubber with a liquid of which a large proportion is a hydrocarbon of a viscid and gummy nature, forming a yeasty froth on the surface of the liquid and having an affinity for sulphur, under the conditions created, greater than the lessened affinity for sulphur possessed by the rubber, whereby combined sulphur will be liberated from the rubber. (Cyrus Field Willard, San Diego, California. United States patent No. 1,322,077.)

DEVULCANIZING PROCESS AND PRODUCT. Boiling vulcanized rubber with a viscous mixture of a tar and a flux of a liquid hydrocarbon in the presence of water. (Cyrus Field Willard, San Diego, California. United States patent No. 1,322,151.)

PROCESS FOR DEVULCANIZING VULCANIZED RUBBER, comprising effecting the liberation of more or less of the combined sulphur by boiling the rubber with an emulsoid colloid solution and a detergent or cleansing solution. (Cyrus Field Willard, San Diego, California. United States patent No. 1,322,152.)

TREATING RUBBER by incorporating therewith sulphur and titanic oxide and vulcanizing the mixture. (Louis E. Barton, Niagara Falls, New York, assignor to The Titanium Alloy Manufacturing Co., New York City. United States patent No. 1,322,518.)

PLASTIC COMPOSITION consisting of caoutchouc, wax, non-drying oil, inert filler, and coloring matter. (Stanley H. Rood, Hartford, Connecticut. United States patent No. 1,322,823.)

THE UNITED KINGDOM.

RUBBER COMPOSITION consisting of powdered slate mixed with rubber, rubber substitute or waste or recovered rubber and sulphur. Example: 50 parts of slate, 35 of rubber and 15 of sulphur yield a product suitable for packing, tires, mats, etc. (W. F. Macdonald, 53 Palace Court, Bayswater, London. British patent No. 130,528.)

GERMANY.

PROCESS FOR MAKING HARD AND SOFT RUBBER FACTICE.

SOFT FACTICE. Into a mixture of 100 parts of linseed oil, 10 parts of acetic acid, and 10 parts of a 10 per cent solution of ammonia are poured in a thin stream 20 parts of chloride of sulphur thinned with 20 parts of water and neutralized with 20 parts of a 15 per cent solution of ammonia. The mixture is steamed and dried until thick flowing. The product is a very elastic, soft, rubbery mass, which, on being heated to 240 degrees C., becomes homogeneous and weatherproof. Formic, acetic, or other fatty acids, or unsaturated acids of the acetic series, may also be used.

HARD FACTICE. Liquid emulsions prepared according to above example are neutralized with ammonia, steamed until they are plastic, and mixed with three parts by weight of lead, zinc or iron oxide and sulphuret of antimony. The mass is pressed in vacuum at 50 to 70 degrees C., then dried and pressed for six hours at six or more atmospheres. The result is a solid rubber-like mass which can be used as a substitute for hard rubber. (H. Otto Traun's Research Laboratory, Hamburg. German patent No. 314,560. February 25, 1915.)

OTHER CHEMICAL PATENTS.

GERMANY.

PATENTS ISSUED, WITH DATES OF APPLICATION.

317,641. (April 16, 1916.) Artificial arm. Allgemeine Krankenhaus-Einrichtungs Geschellschaft m.b.H., 20-21 Johannisstrasse, Berlin, and Karl Albert Scherer, 113 Hartwigstrasse, Berlin-Pankow.

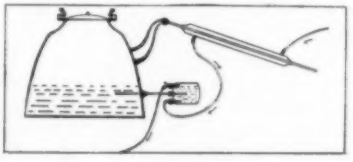
317,695. (April 25, 1917.) Packing with rubber ring, particularly for coolers with interchangeable parts. Süddeutsche Kühlerfabrik, Feuerbach, Württenberg.

LABORATORY APPARATUS.

AN ALUMINIUM WATER STILL.

PURE DISTILLED WATER especially free from potassium, sodium and copper is obtainable by the use of an aluminum still described by T. O. Smith in "The Chemist-Analyst."

The apparatus is set up as follows: a hole is punched from the inside of an aluminum tea kettle, about two inches from the bottom, with a sharp punch so that the edges of the hole are smooth, without cracks and flared as much as possible. Into this hole is fitted an aluminum tube of convenient length for connecting a leveling bottle as shown in the drawing. The tube is secured and the hole made water-tight by wrapping the flared edges and the tube with cotton yarn to a thickness of about one-half inch. A Liebig condenser is fitted with an inner tube of aluminum into the spout of the kettle, and connection made tight with cotton yarn wrapping. The lid is held on by small clamps. A three-hole Woulfe bottle connected with the leveling tube from the kettle receives the overflow from the condenser through a rubber tube and maintains the water in the kettle at the level of the overflow opening from the bottle. This overflow opening is provided with a curved glass tube for equalizing the air pressure in the bottle. In this manner the waste water from the condenser is made to replace the water in the kettle as fast as it is removed by distillation.



A NOVEL STILL.

New Machines and Appliances.

MACHINE FOR CUTTING PRESSED ON TRUCK TIRES.

SERVICE stations find it frequently impossible to press off old tires no matter what size press is used. This is especially true in the case of "stickers" or tires on which the rim has been turned by contact in the street with stones, etc. Very few stations are equipped with presses of sufficient throat opening to handle large size dual tires and in trying to press off these tires the press is broken. To afford a simple and efficient means for overcoming these difficulties the machine here pictured has been especially designed for cutting off pressed-on truck tires.

SOLID TIRE CUTTING MACHINE.

The basic principle of the power hack-saw has been combined with the mechanical features necessary to perform efficiently the wide and varying work required by a machine of this type. The machine is of heavy construction and designed with the idea of giving dependable service under the hardest working conditions.

The machine has a movable platform which may be raised and lowered so as to take care of any size or height of truck wheel now in use, and it is also of sufficient capacity for the widest single or dual truck tire. It is so arranged that when the blade finishes the cut, it is parallel with the felloe of the wheel and automatically stops just before striking the felloe. In approximately ten minutes' time the machine can cut a dual tire seventeen inches wide. (Racine Tool & Machine Co., Racine, Wisconsin.)

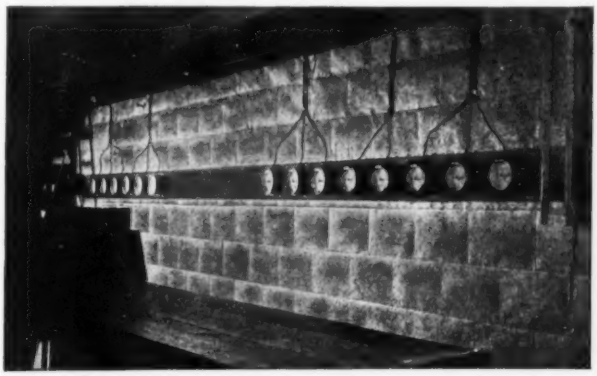
RECORDING THERMOMETERS FOR RUBBER VULCANIZERS.

Everywhere to-day manufacturers of rubber goods realize that temperature has a great effect on the chemistry of vulcanization, and that by watching and controlling it they can produce the best quality and reproduce it at will. Indeed, given the proper temperature, even an inferior grade of material can be used with the confidence of turning out a good product. So vital is the question of temperature that more vulcanizers than ever are being equipped with recording thermometers which give accurate information that forms the basis of all intelligent control.

FOXBORO RECORDING THERMOMETER.

The accompanying illustrations shows a recording thermometer and an installation of fourteen of these on rubber vulcanizers at a large footwear plant in Massachusetts. The instruments, equipped with patented improvements, are of the inverted type and have variable lengths of lead-protected connecting tube and lead bulbs for protection against the fumes from the cure. These thermometers depend for their operation upon the pressure of a saturated vapor of a volatile liquid. They are so constructed as to take care of any temperature from plus-50 degrees to plus-400 degrees Fahrenheit, or the corresponding ranges in Centigrade or Réaumur. The charts have increasing graduations that make the upper or working portion of the scale clear and open, which is an advantage when close readings are a matter of vital importance.

An automatic temperature controller which not only controls the temperature but also the duration of the heat may be supplied, thus making the curing of rubber independent of human conditions and eliminating all hand control. (The Foxboro Co., Inc., Foxboro, Massachusetts.)



FOOTWEAR VULCANIZER EQUIPPED WITH RECORDING THERMOMETERS.

VERTICAL CEMENT CHURNS.

Vertical cement churns are used in rubber mills when the making of certain solutions requires this particular type of mixer.

The machine here shown is supplied by the makers in three sizes, the steel tanks measuring, respectively, 24 by 24, 36 by 36, and 48 by 48 inches. They are all equipped with belt-driven agitators and gate valves for drawing off the solution.

TYPE "E" MIXER.

While stock mixers are built with steel tanks, they are also furnished with wood tanks, vertical shafts and stirring devices made of wood for use in connection with materials that attack iron. (The Patterson Foundry & Machine Co., East Liverpool, Ohio.)

SECTIONAL TIRE CORE REMOVER.

The removal of sectional cores from tire casings after curing is facilitated by the ingenious device that is adjustable to any size core, and which is shown in the accompanying illustration.

CORE PULLER.

Small holes in which the prongs of the puller are inserted may be drilled in the core sections, or the raised parts of the core may be gripped by the prongs that are operated by the hand-lever attachment. By means of this lever the sections are easily removed without kinking the tire beads. (Gillette Rubber Co., Eau Claire, Wisconsin.)

BRAKE LINING CUTTER.

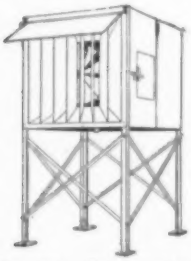
This is a handy bench device that was primarily designed to cut brake linings and intended to be used by the dealer or garage man. In fact, the rubber manufacturer also could undoubtedly find this tool adaptable in many ways, preferably as a hand stock cutter.

RAYBESTOS CUTTER.

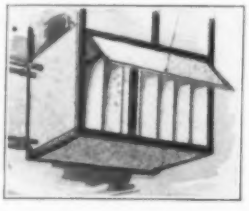
The cutter blade is of steel, 3½ inches wide, and may be easily removed for sharpening. The hand lever is 15 inches long, enabling the operator to cut easily brake lining up to one-half inch in thickness. (The Raybestos Co., Bridgeport, Connecticut.)

ILGAIR UNIT SYSTEM OF HEATING.

The question of heating is of importance to every rubber manufacturer, and particularly so in view of the high cost of fuel. Direct heating requires numerous radiating surfaces, and blast heating with its long ducts and high-power blowers is costly. According to the present system each unit constitutes a separate heater, and both the volume and the distribution of the heat are controlled at one source.



PEDESTAL SUSPENSION.



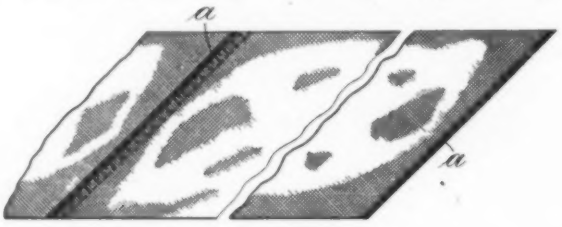
CEILING SUSPENSION.

This unit heater is a cabinet, open at both ends, containing a two-stack radiator and a motor propeller fan. The air is drawn in over the heated coils at about 1,000 feet per minute and discharged at about 2,500 feet per minute. Stationary deflectors spread the air in a horizontal plane, while a movable one controls the placement of the air, thus controlling the direction of the heat. As the air at the breathing line warms up, the deflector is raised and the air current straightens out to a distance of 50 to 60 feet, the low velocity precluding drafts or dust circulation on the floor. There are two different types—a pedestal model for floor installations and one for ceiling suspension. (Ilg Electric Ventilating Co., Whiting and Wells streets, Chicago, Illinois.)

MISCELLANEOUS PATENTS.

ELASTIC FABRIC FOR TIRE BUILDING.

FOR THE PURPOSE of at once avoiding waste and rendering elastic the splice formed by joining bias-cut strips of frictioned fabric for making tires and similar articles, the simple device of slitting the selvages of the fabric at frequent intervals



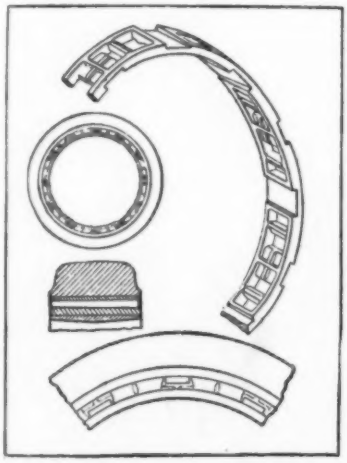
TIRE BUILDING FABRIC.

has been patented. The result is that such a selvage edge bias splice is as elastic as any other portion, the joint is less bulky and all waste is eliminated. (Kurt W. Jappe, assignor to The Miller Rubber Co., both of Akron, Ohio. United States patent No. 1,318,876.)

MACHINERY PATENTS.

DEMOUNTABLE RIM FOR SOLID TIRES.

THIS is a detachable rim for solid tire wheels and may be applied to any wheel that has an ordinary turned rim intended to fit a pressed on tire but calls for a tire of a little larger diameter than that of the wheel. The space between the rim and the inside of the band of the tire is taken by an annular ring of steel or other cast metal which is wedged in place and thus holds the tire in position. The grooves for the wedges are spaced around the ring, being cut alternately on the outer and the inner surface; they taper in depth across the rim but their sides are parallel. Neither the rim of the wheel nor the inner circumference of the band tire is cut.



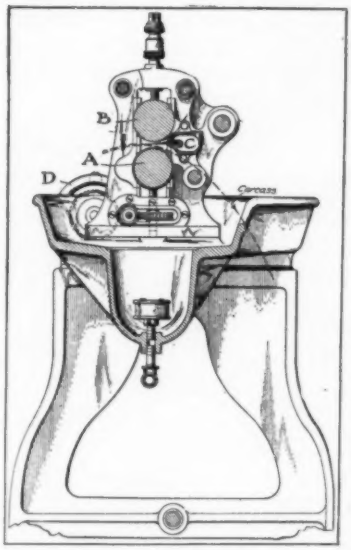
SOLID TIRE DEMOUNTABLE RIM.

The rim is turned internaliy so that it slides easily over the outer surface of the wheel rim; externally its dimensions allow the band tire to slip

easily into place. The wedges, which are made all of the same size, are then driven into place and may be fastened permanently by screws. (The Dunlop Rubber Co., Limited, and W. W. Haniell, 14 Regent street, Westminster, London, England, British patent No. 126,792.)

PNEUMATIC TIRE TREAD SLICING MACHINE.

In reclaiming scrap tires the tread is removed, prior to placing the carcass in the acid baths, by slicing off the tread by hand which results in uneven work and is a relatively costly operation. The machine here shown in sectional elevation severs the tread by action of a reciprocating knife and provides means for supplying water to facilitate the cutting operation.



TIRE TREAD SLICER.

The beads are first removed and the tire is fed between the rollers *A* and *B*, the center portion of the former being cut away to accommodate the bulge of the tire flattened between the rollers. The knife *C* reciprocates horizontally but is fixed vertically, consequently the upper roller *B* must be adjusted vertically until the correct thickness of the tread is gaged between the knife and the bottom periphery of the idler roller *B*. The vertical adjustment of the lower roller *A* is made by the hand-wheel *D*.

When power is applied, the knurled portions of the lower roller engage the inner surfaces of the tire side walls, drawing the tire between the rollers while the reciprocating knife slices the tread. A pump supplies a continuous flow of the cutting lubricant that collects in a sump, is strained and delivered to the pump line for reuse. (Edward Nall, assignor to The Goodyear Tire & Rubber Co., both of Akron, Ohio. United States patent No. 1,319,301.)

OTHER MACHINERY PATENTS.

THE UNITED STATES.

NO. 1,320,399. Tire mold. W. C. Lipe and A. G. Bolster, Syracuse, N. Y., assignors to The Fisk Rubber Co., Chicopee Falls, Mass.
1,320,728. Tire-head stripper. G. E. Blaylock, Baltimore, Md.
1,320,812. Vulcanizing apparatus for tires, with conveyor, etc. C. W. Wattleworth, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,320,816. Collapsible core for tires. J. Yemiker, Akron, O.
1,321,228. Machine for cutting and rolling fabric. T. Midgley, Worthington, O., assignor to Morgan & Wright, Detroit, Mich.
1,321,229. Combined mold and fluid bag for tires. T. Midgley, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Massachusetts.
1,321,404. Ring core for building pneumatic cord tires with special cord arrangement. B. L. Stowe, Jersey City, N. J., assignor to Morgan & Wright, Detroit, Mich.
1,321,493. Fabric-laying attachment for tire-making machines. J. E. Thropp, assignor to The De Laski & Thropp Circular Woven Tire Co.—both of Trenton, N. J.
1,321,494. Fabric-laying attachment for tire-making machines. J. E. Thropp, assignor to The De Laski & Thropp Circular Woven Tire Co.—both of Trenton, N. J.
1,321,790. Fabric-stripping machine. C. D. Hibbs, Fort Worth, Tex.
1,321,961. Tire vulcanizer. H. K. Wheelock, assignor to Western Vulcanizer Manufacturing Co., a copartnership consisting of H. K. Wheelock, F. A. Weller, and W. R. Fontaine—all of Chicago, Ill.
1,322,196. Device for inflating and indicating pressure in tires. O. H. Meyers, Dudley, Ill.
1,322,464. Hose-making machine. J. M. Oden, Brooklyn, N. Y.
1,322,944. Mandrel for tube winding. J. F. Pierce, Glynrich, assignor to American Vulcanized Fibre Co.—both of Wilmington, Del.
1,323,164. Collapsible core for tires. P. and B. De Mattia, Clifton, N. J.
1,323,165. Collapsible core and chuck for tires. P. and B. De Mattia, Clifton, N. J.
1,323,213. Rubber-working machine. G. W. Bulley, Chicago, Ill.

THE DOMINION OF CANADA.

194,070. Apparatus for building tires. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of T. Midgley, Worthington, O., U. S. A.
194,071. Footwear-last connections, etc. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of A. D. Warner, Mishawaka, Ind., U. S. A.

NEW ZEALAND.

42,098. Machine for shaping tire fabric on revoluble core. J. D. Thomson, 377 Buckingham street, Akron, O., U. S. A.

PROCESS PATENTS.

THE UNITED STATES.

NO. 1,321,223. Manufacture of strand fabric and covering webs. M. A. Marquette, Springfield, assignor to The Fisk Rubber Co., Chicopee Falls—both in Massachusetts.
1,321,402. Manufacture of pneumatic tires by doubling cords backward and forward upon themselves, etc. B. L. Stowe, Jersey City, N. J., assignor to Morgan & Wright, Detroit, Mich.
1,322,614. Manufacture of dress shields. Le R. H. Rand, Brooklyn, N. Y.
1,322,843. Manufacture of rubber rings, etc. H. E. Townsend, assignor to Anchor Cap & Closure Corp.—both of Brooklyn, N. Y.

THE DOMINION OF CANADA.

194,043. Formation of seamless air-tight inner tubes. H. B. Wallace, St. Louis, Miss., U. S. A.
194,113. Manufacture of pneumatic tire casings. J. M. Gilbert, New York City, assignee of F. B. Carlisle, Davisville, R. I.—both in U. S. A.

NEW ZEALAND.

42,078. Retreading tires. S. H. Goldberg, 1918 Prairie avenue, Chicago, Ill., U. S. A.
42,276. Retreading tires. S. H. Goldberg, 1918 Prairie avenue, Chicago, Ill., U. S. A.

RUBBER-MAKERS' CRAYON.

While it would seem at first thought that any sort of marking crayon would be adaptable to rubber workers' use, it is, in practice, quite to the contrary. The fact is, a high-grade wax

"SUPERMARK" CRAYON.

crayon with unusual lasting qualities is required and one that can be efficiently used for marking hot or cold rubber sheets, molds, cores, etc.

The crayon here pictured may be obtained in the four following colors: black, yellow, blue, and red. (Zelnicker Crayon Works, St. Louis, Missouri.)

ACCESSORY MANFACTURERS AT THE TRACTOR SHOW.

Arrangements have been made with the Kansas City Tractor Club whereby members of the Motor and Accessory Manufacturers' Association are to participate in the Fifth Annual Tractor Show to be held in Kansas City from February 16 to 21, inclusive, 1920. Applications and diagrams will be forwarded to members shortly, and indications point to a large and representative number of exhibitors.

The following are the shows sanctioned by the Motor and Accessory Manufacturers' Association:

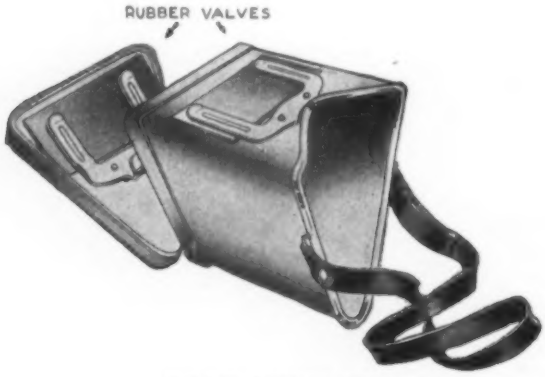
New York (both passenger and truck shows) Jan. 3-10.
Chicago (both passenger and truck shows) Jan. 24-30.
Minneapolis—January 31-February 7.
Kansas City—February 16-21.
Boston—March 13-20.

This is the largest number of shows ever sanctioned by the Association for any one year. Applications for space already received for the New York, Chicago and Boston shows are exceeding all previous records, both in the number of exhibitors and the amount of space applied for. It is expected that this will also hold true of the Minneapolis and Kansas City shows.

New Goods and Specialties.

AN INHALER WITH RUBBER VALVES.

A DEVICE intended for use with a remedy to relieve by inhalation diseased conditions of the air passages, et cetera, is illustrated below. It is made of metal and has a strap to hold it in place over the nose, the strap passing



MAN-HEIL AUTOMATIC INHALER.

around the head. Provision is made for the application of a cleansing antiseptic to absorbent material stored within the inhaler, which can be renewed frequently. Two rubber valves form the automatic feature of the inhaler, one of these permitting the inhalation of fresh air, which the inhaler filters and medicates, and the other, the exhalation of the gases formed by breathing. This inhaler may be worn when awake or asleep. (Frederick Heilman Co., 138 Market street, Johnstown, Pennsylvania.)

A NEW CORD TIRE SOLE.

A cord tire sole made from new live rubber and usual standard cord tire fabric is shown in section in the accompanying illustration. It fits over all sizes of cord tires and is held in place by a specially prepared cold-cure self-vulcanizing cement which causes the tire sole to become an integral part of the tire. In applying, the selected worn casing is properly prepared by buffing off the surface until it is clean. Then the tire sole is placed entirely over it and cemented to it. The tire is then held to the rim by inflation in the usual manner. This particular tire sole is patented and the inventor has put the accessory on the market with a "no limit mileage guarantee." (Sturges Tire & Rubber Co., Oakland, California.)

STURGIS CORD TIRE SOLE.

TRANSPARENT TOBACCO POUCHES.

What is said to be a popular article in England is a transparent rubber tobacco pouch, some of which are red. Being transparent, these pouches enable the user to note the amount of contents. ("The India-Rubber Journal.")

A BRITISH MOTOR WATERPROOF.

A new waterproof outfit for motoring, which was shown at the English motorcycle show, recently held at Olympia, is described as follows in "The India-Rubber Journal," London:

"Double-breasted jacket, a garment shaped to the figure, having two expanding panels, two skirt vents, and deep pouch or bellows-shaped pockets besides an outside breast pocket; worn with a wide-fitting seatless trouser."

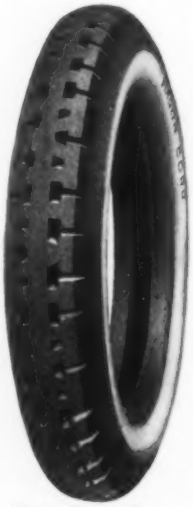
AN ATTACHMENT FOR PENCILS, ETC.

An attachment device to facilitate the gripping of penholders, pencils, and other similar articles consists of a soft rubber sleeve which, because it is rubber, is adaptable to pencils or penholders of different diameter. There are longtudinal slits which facilitate adjustment and use. This device has been patented in the United States. (M. J. McGuigan, Ashland, Wisconsin.)

RUBBER SLEEVE FOR PENCILS.

"TIRE LIFE."

A new compound intended to be used as a preservative of all kinds of rubber goods, including belting, hose, valves, valve seats, gaskets, packing, matting, rubber boots, overshoes, etc., and particularly tires is called "Tire Life." It is applied with an ordinary paint brush after the articles have been first washed and dried. (Camphuis, Rives & Gordon, Inc., 81 New street, New York City.)



MASON TRUCK CORD TIRE.

A TRUCK CORD TIRE.

The growing popularity of cord tires of the pneumatic type for use on trucks and other heavy motor vehicles is responsible for many manufacturers of other tires going into the manufacture of this particular type. The accompanying illustration shows the tread design of one of the new pneumatic truck cord tires. (The Mason Tire & Rubber Co., Kent, Ohio.)

THE "TRIANGLE TREAD" CORD TIRE.

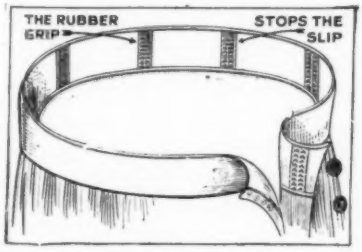
Another cord tire of pleasing design is known as the "Triangle Tread." The well-known resiliency of the cord tire is produced by the method of construction whereby rubber-coated cords are embedded in rubber without the fabric construction so familiar in the older type of tires. Additional resiliency with less inflation is provided by the cord tire.

GORDON "TRIANGLE TREAD."

The tread design of a tire is intended to make it grip the road surface firmly and without the disagreeable and dangerous slipping which automobilists so greatly dislike in tires upon which they depend to give them the maximum of service and safety. (The Gordon Tire & Rubber Co., Canton, Ohio.)

A BELT WITH A GRIP.

A belting intended for wear with ladies' skirts is made in the usual way, but has incorporated in it a flexible boning that adds to its rigidity and at the same time permits it to yield freely to the movement of the body. Over each bone is a strip of rubber fabric containing a number of rubber grips which, when brought in contact with the garment, keep it in position. This belting worn with shirtwaist and skirt, keeps the waist down as well as holding the skirt up. The invention can be washed and boiled, the manufacturer claims, without losing any of its shape or rigidity. The "Gripfast" belting is put up on reels containing twelve yards and is packed one reel to the box. The idea is patented. (David Basch, 23-25 East 21st street, New York City.)



"GRIPFAST" SKIRT BELTING.

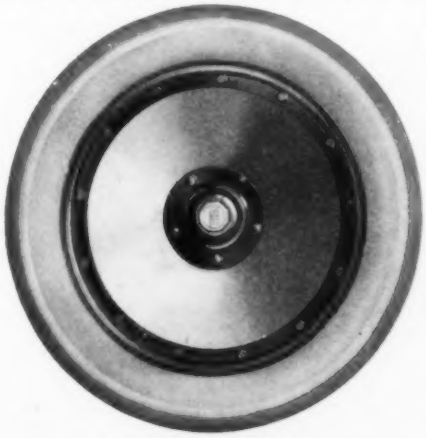
"NITREX."

A substance to prevent the oxidation of tires and the accumulation of rust on tire rims has been developed under the trade name "Nitrex." It is intended especially for painting spare tires, is applied with a brush, and dries instantly. It produces a jet-black, brilliant surface, but comes off when the tire is put into use, leaving the spare like the other tires in appearance. (The Sterling Varnish Co., Pittsburgh, Pennsylvania.)

SQUEEGEE HEEL.

ANOTHER NON-SKID HEEL.

A rubber heel embodying the popular non-skid element employs a series of V-crimps as the patented feature in accomplishing its purpose. It is claimed by the manufacturer that these heels will prevent slipping on wet or greasy pavements and ice and snow. The V-crimps, it is said, grip the pavement securely until the foot is released for the next step. A similar construction has been used by some English designers in constructing rubber heels, the V-cuts being disposed at varying angles to produce different designs. (The Squeegee Heel Co., Elyria, Ohio.)



THE "DISTEEL" WHEEL.

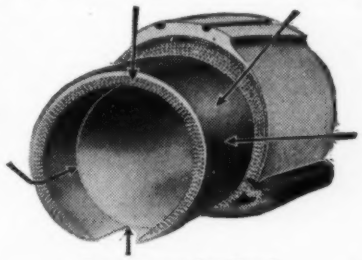
ATTRACTIVE WHEELS.

Simplicity of design in any article makes for elegance. The wheel shown here has not only simplicity of design but of construction likewise, and the result is pleasing.

The claim made by the manufacturer is that these wheels are strong and very light, being proportionately lighter on heavy cars than the ordinary wheel equipment. They likewise facilitate the changing of both wheels and tires. (Detroit Pressed Steel Co., 1802 Mt. Elliott avenue, Detroit, Mich.)

"A TIRE WITHIN A TIRE."

An inner tire made of first-class fabric and rubber tends to prevent punctures, blow-outs, rim cuts, etc., in the tires with which it is used. In the three and three and one-half inch sizes it is made with three layers of new fourteen-ounce fabric, while the four-inch and larger sizes have four layers. The outside is a coat of soft cushion rubber to prevent stone bruises, and is roughened to prevent friction. This, the manufacturer claims, tends to prevent the creation of heat inside the casing because the "Planet Sub-Tire" does not slip. No cement is required or used to keep this inner tube in place. (Planet Rubber Co., 125 East Ninth street, Los Angeles, California.)

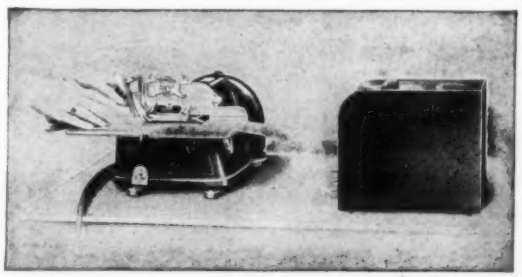


THE "PLANET SUB-TIRE."

"LIGHTNING" LETTER-OPENER.

An electrically operated letter-opener handles five hundred letters a minute. The machine is made by the Bircher Co., 110 West 34th street, New York City, and is operated by a Westinghouse motor mounted within the case, connected with an ordinary lamp socket.

The mechanism is extremely simple, so that almost anybody can use the device. The envelopes, placed on the feed table, are conveyed by a rubber feeding belt between two cutting knives, which clip off the exposed edge. In a hand-operated machine of the same type, a rubber transmission belt is used on the driving pulley. (Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania.)



"LIGHTNING" LETTER OPENER.

A CURLING SHOE.

The manufacture of footwear is specialized more and more each year. One of the winter sports, more popular in Canada than in the United States, is curling, a game played on smooth ice, and therefore requiring the contestants to wear warm and anti-slip footwear. The shoe here shown is of black cashmerette, with heavy heel, semi-double sole, and high strong foxing. It is lined with felt and is worn not as an overshoe but as a shoe, with a heavy stocking. (The Canadian Consolidated Rubber Co., Ltd., Montreal, Quebec.)

"NEPTUNE" CURLING SHOE.

Activities of the Rubber Association of America.

THE DIVISION MEETINGS of The Rubber Association of America held during December were devoted to routine matters and the business necessary in anticipation of the annual elections to be held early in January.

Active preparations are being made for the coming annual meetings and the 20th annual dinner of the Association, that will undoubtedly be the largest and most representative gathering of rubber men known to rubber history.

STATISTICS OF THE RUBBER INDUSTRY.

NEW YORK, December 16, 1919.

To all manufacturers of rubber products and reclaimed rubber:

There is enclosed an analysis of the statistics compiled from the returns to Questionnaire No. 100 covering the total average daily number of employes, total sales value of production and classified consumption of crude rubber, during the year 1918.

This data is sent you with a new Questionnaire, No. 101, enclosed with my letter of this date, as a report to which our members are entitled by reason of their support in supplying statistics for individual companies, from which this compilation of totals was made.

herewith Questionnaire 101, covering the first half of the year 1919.

It is intended that a questionnaire similar to No. 101 (submitted herewith) will be sent out every six months. This questionnaire has been carefully prepared in order to reduce to a minimum the information desired, but at the same time to provide the basis for a comprehensive picture of the whole industry. In designing the questionnaire, your directors and their special committee on statistics have had in mind the desirability of accumulating every half-year the sort of information which is now collected every five years by the Government in the Census of Manufactures, so that we shall have at all times recently collected statistics which will indicate the size and importance of our industry.

The desirability of there being available statistics which accurately reflect conditions in the rubber industry and the relation of that industry to the commerce of the country is very pronounced in connection with work such as that which will be undertaken by a special joint legislative committee, comprising several factors in the automotive industry, at the instance of the Tire Divisions of this Association, with the approval of the Executive Committee. The enactment of Federal and State legislation which in any way concerns the interest of our tire

ANALYSIS OF STATISTICS COMPILED FROM QUESTIONNAIRE NO. 100.

AVERAGE TOTAL DAILY NUMBER OF EMPLOYES.

1917.			1918.				
				425 Manufacturers.			
103 Manufacturers. Actual Reported Total.	452 Manufacturers. Actual Reported Total.	Percentage Relation of Total 103 Mfrs. to Total 452 Mfrs.	103 Manufacturers. Actual Reported Total Same Mfrs. as Reported 1917.	Actual Reported Total	Estimated Total. (See Note)	Decrease 1918 Under 1917.	Per cent of Decrease.
151,078	207,714	73	148,787	None	203 813	3,896	1.88

NOTE.—Obtained by applying percentage (73%—which total of 103 manufacturers bore to total of 452 manufacturers in 1917) to figures reported by same 103 manufacturers for 1918, viz., 148,787.

SALES VALUE OF TOTAL PRODUCTION.

1917.			1918.				
				452 Manufacturers.			
103 Manufacturers. Actual Reported Value.	452 Manufacturers. Actual Reported Value.	Percentage Relation of Total 103 Mfrs. to Total 452 Mfrs.	103 Manufacturers. Actual Reported Value Same Mfrs. as Reported 1917.	Actual Reported Value.	Estimated Value. (See note)	Increase 1918 Over 1917.	Per Cent of Increase.
$654,948,376	$895,816,248	73	$819,159,105	None	$1,122,135,760	$226,319,512	26.4

NOTE.—Obtained by applying percentage (73%—which total of 103 manufacturers bore to total of 452 manufacturers in 1917) to figures reported by same 103 manufacturers for 1918, viz., $819,159,105.

POUNDS OF CRUDE RUBBER USED.

Products	1917.	Estimated for 1918.	Per cent of Increase 1918 over 1917.	Per cent of Decrease 1918 under 1917.	Per cent to total 1918.	Per cent to total 1917.
Casings under 6 inches.	162,643,482	140,021,023	.....	13.91	43.40	53.13
Tubes under 6 inches.	35,704,446	32,902,135	.....	7.85	10.20	11.67
Solid tires	25,055,673	50,024,166	99.65	.....	15.51	8.19
Other tires and tire sundries	9,983,195	14,221,023	42.44	.....	4.41	3.26
Tires, totals	233,386,796	237,168,347	1.62	.....	73.52	76.25
Mechanical goods	21,857,385	22,101,528	1.12	.....	6.85	7.14
Boots and shoes.....	26,823,689	31,468,843	17.32	.....	9.75	8.76
Other products	24,045,782	31,867,887	32.53	.....	9.88	7.85
Grand totals	306,113,652	322,606.605	5 39	.....	100.00	100.00

It is being distributed, however, regardless of whether or not a response to Questionnaire No. 100 was made by your company, but it is to be understood that, beginning with the enclosed Questionnaire No. 101, a compilation of the statistics will be sent only to those companies who furnish the data called for.

A. L. VILES, General Manager.

QUESTIONNAIRE NO. 101.

NEW YORK, December 17, 1919.

To all manufacturers of rubber products and reclaimed rubber:

In furtherance of the plan for collecting basic figures regarding the rubber industry, submitttd to you by your directors on March 24, 1919, and approved by the membership through their favorable replies to the letter of that date, we are submitting

manufacturers is to be carefully watched, with a view to make it possible to keep abreast of developments of this kind, and in this connection the statistics which are to be secured by questionnaires, such as the enclosed, will doubtless be of inestimable value.

The traffic and transportation interests of our members is given a great deal of attention by the Traffic Committee of the Association which knows, from much experience in dealing with the Railroad Administration and the officers of the individual carriers prior to Federal control, that if the rubber industry, through this Association, is able to produce accurate and comprehensive data concerning the industry in support of or in opposition to contemplated railroad legislation with respect to rates, rules, classification, etc., the influence thus brought to bear through the presentation of facts and figures is a very valuable factor in the strengthening of the position of the rubber industry.

Arrangements have been completed whereby the Guaranty Trust Company of New York will serve as the statistical agent of The Rubber Association in collecting the data requested in The Rubber Association questionnaires. These questionnaires are to be returned to the Guaranty Trust Company of New York, which then consolidates the individual returns, and submits the *total figures only* to The Rubber Association, together with a list of the firm members who have cooperated in making the total figures possible. The *total figures only* will be published by the Rubber Association, and will be sent only to the firm members who have made returns for their companies.

The Guaranty Trust Company will use all possible caution to insure secrecy for the individual returns which it receives, and manufacturers can make these returns with entire confidence

that only *total figures for the entire industry* will be published and that no one except carefully selected employes of the Guaranty Trust Company will have access to the individual returns.

Your Board of Directors believes that if a little thought is given to this matter along the lines of the foregoing it will become apparent to you that the collection and compilation of the statistics asked for is very much to be desired and that we shall accordingly be favored with a prompt and complete response for your company.

A stamped envelope addressed to the Guaranty Trust Company, to whom the enclosed questionnaire is to be returned, is sent you herewith for your convenience.

A. L. VILES, General Manager.

INDUSTRIAL RELATIONS COMMITTEE.

NEW YORK, December 26, 1919.

To firm members:

It is believed by the Association's executives that nearly all manufacturers fully realize the unusual and radical changes that have taken place with respect to the relation of employer and employe, these changes being particularly emphasized by the conditions arising during the war.

The war period created a demand for many special products and increased greatly the need for staple articles of utility. For these reasons a premium was placed on the labor required for such unprecedented production.

The unusual demands for labor of all kinds which accompanied production requirements soon led to wage adjustments and many radical changes in working conditions to the extent that nearly all the pre-war standards of employment were completely overturned and employers and employes obtained the new viewpoint required under such changed conditions.

On account of these conditions there seemed to be a desire for a helpful medium in the Association through which discussion and exchange of ideas might be had regarding industrial relations.

At a meeting of the Executive Committee of the Association, held on September 26, considerable discussion was devoted to the desirability of appointing an Industrial Relations Committee, which resulted in President Sawyer's consenting to investigate the situation with a view to placing a definite proposal before the Executive Committee at a future meeting.

Mr. Sawyer was aided in his investigation by directors and superintendents of labor, also factory managers, serving as a temporary committee, representing all of the various rubber manufacturing districts or centers, and the information brought forth by this investigation indicated clearly that much benefit might result from the formation of an Industrial Relations Committee.

At the Executive Committee meeting of December 5, it was definitely decided to form an Industrial Relations Committee along lines similar to the Association's traffic organization and that the total membership of the committee should not exceed twenty-five, ten of which should constitute an Executive Relations Committee.

It was further decided that the committee should be appointed with full consideration for territorial representation. Consequently, there were selected four representatives from Akron, one from Trenton, one from Canada, three from New York and New England and one from the Middle West, as follows, to constitute an Executive Industrial Relations Committee.

AKRON.

J. W. Thomas, Firestone Tire & Rubber Co.
C. Jahant, General Tire & Rubber Co.
M. A. Flynn, The B. F. Goodrich Rubber Co.
William Stephens, The Goodyear Tire & Rubber Co.

TRENTON.

C. H. Oakley, Essex Rubber Co.

CANADA.

D. E. Beynon, Dunlop Tire & Rubber Goods Co., Ltd.

NEW YORK and NEW ENGLAND.

H. T. Martin, The Fisk Rubber Co.
H. L. Baxter, Hood Rubber Co.
C. S. Ching, United States Rubber Co.

MIDDLE WEST.

Members of the Association in the middle western territory have been asked to select their representatives, but we have not yet received definite advices.

The Executive Committee of the Association decided that the Executive Industrial Relations Committee shall recommend the additional fifteen members who, with the ten executives, shall make up a committee of twenty-five, and it is expected that the recommendations shall recognize the idea of territorial representation in the same manner as in the selection of the Executive Industrial Relations Committee.

It is expected that the Industrial Relations Committee shall first endeavor to analyze the methods now being used in the rubber industry with respect to fundamental relations between employer and employe, including the organization of factory personnel or employment departments, the selection and assignment of new employes, the medium of contact between employer and employe, factory working conditions, health, sanitation, welfare, training of foremen, and probably, wages.

It is further expected that following the analysis and exchange of ideas respecting the fundamental conditions referred to in the foregoing, the committee shall convey to the membership information and recommendations embodying the best features of the various plans analyzed.

It is hoped that the work of this committee shall become a constructive and useful factor in association work, and also that all members shall assist the work by presenting through this office subjects or problems for analysis and discussion at the committee meetings.

A. L. VILES, General Manager.

INDUSTRIAL RELATIONS COMMITTEE MEETS.

NEW YORK, December 26, 1919.

To firm members:

The first regular meeting of the Executive Industrial Relations Committee was held at this office on December 12. The election of officers for the year 1920 was first given attention and the following members of the committee were unanimously elected to the respective positions: C. S. Ching, chairman; H. L. Baxter, 1st vice-chairman; C. H. Oakley, 2nd vice-chairman.

After the election of officers, the entire day was given to a discussion as to the information needed from firm member manufacturers respecting the present personnel or employment organizations, this discussion being predicated on the committee's conclusion that, undoubtedly, every employer in the rubber industry desires to make adequate provision for efficient supervision of the relation between employer and employe.

It was the further conclusion of the committee that the five fundamental features of the employment or industrial relation are as follows:

1. Employment,
2. Health,
3. Safety and sanitation,
4. Training of foremen,
5. General service.

In order that the committee may give consideration to the methods that may be productive of the greatest degree of efficiency, it desires to secure from each manufacturing firm member detail information respecting the organization now in existence at each plant for handling this work.

It is hoped that firm members will find it convenient to send the desired information to this office as early as possible in order that the committee may proceed with the work of analysis of the various methods employed. The committee wishes to emphasize that each firm member will ultimately receive the benefit of a comprehensive plan predicated on the best that can be drawn from individual methods and practices and the recommendations or plans submitted by the committee will be compiled in chart form in such manner as to be flexible and easily adapted to large or small organizations.

A. L. VILES, General Manager.

MEETING OF THE SCRAP RUBBER DIVISION.

At the meeting of the Scrap Rubber Division of the National Association of Waste Material Dealers held at the Hotel Astor, New York City, on December 9, the former chairman, Herman Muehlstein, was reelected to serve for the balance of the present fiscal year. In view of the limited attendance of scrap rubber members, no matters of importance were considered for the reason that it is planned to hold a meeting of that division early in January.

NEW YORK RUBBER EXCHANGE.

The delayed publication of this issue, due to the printers' strike, permits the announcement of the organization by the New York Rubber Trade Association, of a crude rubber exchange to serve as a market for dealing in futures along the lines of other market exchanges. The price of a seat is to be $1,000.

The Obituary Record.

DEAN OF SHOE TRADE JOURNALISM.

GEORGE E. B. PUTNAM, dean of shoe and leather journalists of Boston, died of apoplexy at his home in Newton Centre early on the morning of December 11, 1919, aged 67 years. For thirty-two years Mr. Putnam had been connected with the editorial staff of the "Boot and Shoe Recorder," four years as editor, and was affectionately known as the "encyclopedia" of the staff. He was an authority on footwear matters and the historian of the shoe trades. He was a very prolific writer, and veterans of the trade still quote his "shop tales" in early issues of the "Recorder," and recall the tone and timeliness of his news letters and market reports.

GEO. E. B. PUTNAM.

Early in his editorial career he perfected his knowledge of merchandising by extensive travel in practically every State in the Union, and hundreds of footwear men may remember his pilgrimages of a quarter of a century ago. His trips to Central and South America, the West Indies, Canada and other sections of the Western Hemisphere to study foreign trade extension for the benefit of manufacturers of shoes and rubbers desiring export business, supplied the material for numerous illustrated travelog lectures of interest and charm.

About nine years ago Mr. Putnam relinquished his editorship of the "Recorder," but continued as an associate editor, writing weekly "The Leather Market" and "The Rubber Realm," which had been popular features of the paper for many years. Turning to rubber research work some five years ago, he joined the editorial staff of THE INDIA RUBBER WORLD, and became its Boston correspondent, directory and biographical writer, and librarian, a position which he filled with rare faithfulness.

George Edwin Ballard Putnam, a descendant of the famous Putnams of Revolutionary days, was born in Boston, Massachusetts, December 29, 1851. He attended the Quincy School, and was graduated from the English High School in 1869, being awarded the Franklin Medal for distinguished scholarship. For a time he engaged in the directory business, but gradually drifted into amateur journalism and writing for the trade press. "The Youth's Companion," in the old days when Mr. Ford, its founder, was alive, numbered him on its editorial staff.

Mr. Putnam was a member of the Old Boston Schoolboys' Association, and at one time president of the English High School Class of 1869 Association. Being among the earliest amateur journalists, he became one of the founders of "The Fossils," a New York City club composed of former publishers of amateur papers throughout the country. He was a member of Dalhousie Lodge, A. F. and A. M., of Newtonville, Massachusetts, also of the Boston Shoe Trades Club, and had not missed a single meeting of the Boston Boot and Shoe Club until the session on the evening of December 10, only twelve hours previous to his death. Prominent in church work, he had for the past seven years officiated as a deacon of the First Baptist Church, Newton Centre, Massachusetts.

Every branch of the Boston footwear, rubber and leather trades, and the publications dealing with these industries, joined in honoring his memory at the funeral, which was held in the First Baptist Church at Newton Centre. In the gathering were representatives of the Rubber Club of America, the Boston Boot and Shoe Club, the Boston Shoe Trades Club and the Dalhousie Lodge of Masons. Rev. Charles N. Arbuckle, pastor of the parish, conducted the service, and also read prayers at the family home at 16 Elmore street, Newton Centre. The interment was in Forest Hills Cemetery.

The bearers were: Oscar Blaisdell, of the G. W. Armstrong News Co.; Charles H. Clark, Master of Dalhousie Lodge; Henry H. Kendall, a deacon of the Newton Centre Baptist Church; George W. R. Hill, vice-president of the "Boot and Shoe Recorder"; Arthur D. Anderson, editor of the "Boot and Shoe Recorder"; Harry Olsen, editor of the "Export Recorder"; James H. Stone, manager of the "Shoe Retailer," and Phil M. Riley, of the editorial staff of THE INDIA RUBBER WORLD.

One of those rare gentlemen of the old school, Mr. Putnam closed his Book of Life with that quiet calmness that had characterized his serene and happy, though withal very busy, life. He was a patriotic, clean American, lovable and widely loved. Thinking ill of no man, he embittered none and made a friend of everybody he met. No one ever heard a profane word from his lips. A familiar and a popular speaker at thousands of local and national rubber and shoe trade gatherings, he was "Colonel" Putnam or "G. E. B. P." in affectionate daily greetings. His faithfulness, fairness, integrity and ever ready spirit of helpfulness was an inspiration to his associates, who mourn his loss and by whom he will long be remembered.

He is survived by his widow, Ellen H. Putnam; a son, Russell B. Putnam, of Waterbury, Connecticut, and a daughter, Mrs. Harry B. Chesley, of East Sumner, Maine.

PROMINENT IN THE WIRE INDUSTRY.

William Ellis Rice, one of the pioneers in the New England wire industry, died December 12, 1919, at his home in Worcester, Massachusetts, aged nearly 87.

As a boy of 18 he entered the employ of Ichabod Washburn & Co., wire drawers and finishers. Seven years afterwards he took a partner and entered the business, first in Connecticut and later building a model plant, for that period, at Holyoke, Massachusetts. In 1865, at the solicitation of Ichabod Washburn, the business was joined with the Washburn & Moen Wire Works, afterwards the Washburn & Moen Manufacturing Co., Mr. Rice becoming a director and later an executive officer. He introduced in this country the continuous rod rolling system, and later was the first American to import Swedish iron. In 1891, as president of the Worcester Wire Co., and of the Washburn & Moen Manufacturing Co., he effected the sale of the two corporations to the American Steel & Wire Co., after which he retired from business.

Mr. Rice held membership in the Union Club of Boston, the Worcester Boys' Club, Worcester Society of Antiquity, Tatnuck Country Club, Worcester Art Museum, Worcester Art Society, Worcester Club, Worcester Continentals, Worcester Board of Trade and the Home Club of Worcester. He leaves his widow, one son, and one daughter.

R. E. WRIGHT, EUROPEAN MANAGER FOR THE I. B. KLEINERT Rubber Co., was taken suddenly ill in London in returning from a business trip on the Continent and died of a stroke in the latter part of November.

MRS. AUGUSTA NEIDNER, WHO DIED EARLY IN NOVEMBER IN Malden, Massachusetts, at the age of 85 years, was the widow of Charles H. Neidner, who came to this country from Saxony in

1863 and in 1893 established the linen fire hose business now carried on by his three sons, under the name of Chas. Neidner's Sons Co. Mr. Neidner died in 1908. Mrs. Neidner was also born in Saxony and came to this country with her husband 44 years ago. Three sons and two daughters survive her.

RUBBER TRADE INQUIRIES.

THE inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The editor is therefore glad to have those interested communicate with him.

(766.) A reader requests the addresses of manufacturers of wiring machines for applying baby-carriage tires.

(767.) An inquiry has been received for the address of manufacturers of tire wrapping tape, who might have seconds for sale.

(768.) A reader asks for the addresses of manufacturers of rebuilt tires, particularly of the "Popular" and "Leader" brands.

(769.) Request is made for the addresses of manufacturers of rosin spirit who will quote prices and send samples abroad.

TRADE OPPORTUNITIES FROM CONSULAR REPORTS.

Addresses may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or from the following district or cooperative offices. Request for each address should be on a separate sheet, and state number.

DISTRICT OFFICES.	COOPERATIVE OFFICES.
New York: 734 Customhouse.	Cleveland: Chamber of Commerce.
Boston: 1801 Customhouse.	Cincinnati: Chamber of Commerce; General Freight Agent, Southern Railway, 96 Ingalls Building.
Chicago: 504 Federal Building.	Los Angeles: Chamber of Commerce.
St. Louis: 402 Third National Bank Building.	Philadelphia: Chamber of Commerce.
New Orleans: 1020 Hibernia Bank Building.	Portland, Oregon: Chamber of Commerce.
San Francisco: 307 Customhouse.	Dayton, Ohio: Dayton Chamber of Commerce.
Seattle: 848 Henry Building.	

(31,412.) Agency desired by a firm in the Netherlands for tires.

(31,427.) A firm in Persia desires to connect with manufacturers of overshoes and rubber goods. Asks that quotations be accompanied by catalogs and samples, and, if possible, freight rates to Bagdad. Payment 25 per cent when goods are shipped and balance through bank in Persia.

(31,434.) Representative of a firm in Mexico wishes agency from manufacturers for the sale of rubber tires.

(31,440.) A merchant in the Netherlands desires agencies for the sale of rubber goods, such as hose, sheeting, hospital cloth and gloves.

(31,441.) A man in France wishes an agency on a commission basis for the sale of rubber thread for elastic fabrics. Correspondence may be in English.

(31,444.) Commercial agent from Venezuela is in the United States to secure an agency for the sale of elastic material used for suspenders, garters, and notions.

(31,450.) A firm in Greece wishes an agency for the sale of rain coats.

(31,451.) A broker in Italy wishes an agency for the sale of tires, accessories and rubber goods. Correspondence may be in English.

(31,452.) A company in the Canary Islands desires an agency to sell rubber articles. Quotations, c.i.f. the Canaries via Liverpool. Terms 30 days sight up to 60 days, usually granted to purchasers. Correspondence must be in Spanish.

(31,470.) A firm in Belgium wishes an agency for the sale of accessories, tires. Quotations should be c.i.f. Antwerp. Payment, cash. Correspondence and catalogs in French.

(31,499.) A business woman in Belgium, who knows the shoe trade, wants an agency for the sale of rubber overshoes and kindred articles. Quotations c.i.f. Antwerp. Correspondence and catalogs in French.

(31,501.) American firm of exporters wishes to establish in Poland and other European countries permanent agencies for the sale of rubber goods.

(31,503.) American exporters have established agencies in all the chief agencies of the Levant and wish to represent American firms for the sale of automobile accessories.

(31,505.) A manufacturing firm in Belgium wishes agencies for rubber and asbestos packings, India rubber goods and steam packing, especially black india rubber packing. Quotations c.i.f. Antwerp or Brussels. Payment, cash. Correspondence may be in English.

(31,511.) American export firm sending representative to England wishes agency for sale of rubber boots, overshoes, etc. Quotations requested.

(31,520.) Purchasing agent for British importing house wishes agency and to purchase automobile tires, for sale in Czecho-Slovakia, Holland, Spain and Italy. Quote f. o. b. New York.

(31,522.) A firm in Spain wishes to purchase rubber of all kinds for footballs. Correspondence should be in Spanish.

(31,528.) A man in Switzerland wishes agency for sale of tires. Correspondence in French or German.

(31,529.) Agent in the United States of a firm in Finland wishes to purchase rubber goods and belting. Quotations f.a.s. New York. Payment, letter of credit through bank in New York.

(31,532.) A commercial representative in France wants an agency to sell medical and surgical articles in ebonite and rubber. Quotations c.i.f. French port. Correspondence may be in English.

(31,561.) Purchasing agent of firms in France wishes to get in touch with manufacturers of rubber goods.

(31,566.) A firm in Portugal desires to secure an agency for automobile accessories, including tires. Correspondence in English.

(31,614.) Commercial agent in Bulgaria wishes to buy large quantities of rubber shoes. Correspondence may be in English.

(31,618.) Commercial agent in Belgium wishes to buy raincoats. Quotations c. i. f. Antwerp. Correspondence and catalogs in French.

CUSTOMS APPRAISER'S DECISIONS.

No. 38211.—Reappraisement 95726, etc., of Goodyear Tire and Rubber Company, (New York).

AUTOMOBILE TIRES.—Tires entered at Buffalo and Chicago by the Goodyear Tire & Rubber Co. of Canada were appraised for duty at the price charged to dealers. The company has three scales of prices for its tires, one for export and for manufacturers of automobiles, a second for sales to jobbers and a third for sales to dealers. G. A. McClelland held that although the company restricted the methods of selling, there was a wholesale price for the tires in Canada and appraisers were right in levying duty on basis of the price to dealers. (Treasury Decisions, Volume 37, No. 24.)

Protest 851,995-3263 overruled. No. 38207.—United States *vs.* National Gum & Mica Co. (No. 1991) United States Court of Customs Appeals. Appeal from Board of United States General Appraisers, Abstract 43,118.

GUM KARAYA.—Assessed at 10 per cent ad valorem under paragraph 385 of the tariff Act of 1913. Free entry claimed under paragraph 513 as crude rubber, or under paragraph 552 as a crude vegetable substance. Three other protests, but not this one, claimed free entry as a crude drug under paragraph 477. A board heard the four protests and granted the appeal on the ground that gum Karaya was a crude drug. The court, Martin, J., delivering the opinion, modifies the decision by excluding appellee from its effect, as he had not put in the crude gum plea. (Treasury Decisions, Volume 37, No. 23, November 25, 1919). (I. R. W., Oct. 1919, p. 10; Sept. 1919, p. 700).

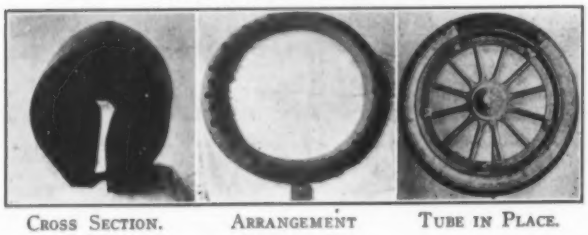
INTERESTING LETTERS FROM OUR READERS.

MAKES THE TIRE PERFECT?

To THE EDITOR:

DEAR SIR:—The perfect tire is here, at least I think so. That is a rather bold statement to make, but in view of the facts, the writer feels safe in such affirmation.

THE SECURITY NO-AIR TUBE.



CROSS SECTION. ARRANGEMENT OF SUCTION CUPS. TUBE IN PLACE.

With the tire tube shown in the illustration a blow-out is an impossibility for the reason that there is no air in the tube to blow out. Also the construction is perfect. It mechanically embodies the basic principles of the pneumatic tube and eliminates the objectionable features of the ordinary air tube.

This tube contains seventy-five per cent pure rubber, coupled with the usual admixture of chemicals. The outside of the tube is recessed by 30 to 40 suction cups which take up and distribute the shock received in running. Anyone who has played basketball knows that the suction cups in the soles of his shoes enable him to come to a quick stop by sticking to the floor. In the same manner do these suction cups cling to the tire casing so that there is no such thing as creeping as often happens with an under-inflated air tire.

I have sharp ears, and I can hear my readers say "Why, that tube is almost solid and with the casing forms a solid tire." True in part, but this tube through its center channel and suction cups offers room for expansion. It is, of course, much heavier than the pneumatic tire. This weight, however, is an asset rather than a liability for various reasons. It is a well-known fact that a car using air tires is to a degree top-heavy. This fact would mean nothing whatever if all the roads in the world were level and smooth, but the motorist knows how rough roads really are. For instance, let us suppose that you are trying to take a rough hill on high. The speed of the car together with the top-heaviness will cause the rear wheels to leave the ground when they hit a rough spot. Every time the wheels leave the ground there is lost power and lost motion, which in turn means abuse of the engine and the tire casings, and invariably the driver has to shift gears to reach the top of the hill. With this heavier tire, the top-heaviness is eliminated, the car is equally balanced, it runs much more smoothly and consequently does not leave the ground on the least provocation. Incidentally that hill can be taken on high.

Tests made personally by the Detroit representative of the firm manufacturing these tires, and extending over a period of two years show a total mileage during that period of thirty-six thousand miles on a single set of tubes. In fact, this test is still going on, for he is using the tubes every day. In the latter part of 1918, he replaced the original set of casings because they were so badly worn that the tubes were visible in half a dozen places—not only visible, but actually riding the pavements. This was after a total run of twenty-four thousand miles.

Another test made by the Detroit Police Department proves quite interesting. In February, 1919, permission was obtained from Captain Kling, then a lieutenant on the Detroit police force, to install a set of tubes on the "minute car" of the department. This car is a general utility Ford touring car which is on the go twenty-four hours a day, and is operated by three shifts of drivers. The tires were installed during an overhaul period and none of the drivers knew of the installation. Three months had gone by before the drivers knew they were using other than pneumatic tubes, as each thought the other fellow was looking after the tires. These three drivers swear by the tubes and claim that the car is giving better service than ever before.

MAURICE S. CLEMENT.

Detroit, Michigan.

THE EDITOR'S BOOK TABLE.

"A RUBBER PLANT SURVEY OF WESTERN NORTH AMERICA." By Harvey Monroe Hall and Thomas Harper Goodspeed. University of California Press, Berkeley, California, 1919. (Paper, 7 x 10½ inches, 121 pages.)

IN THIS BOOK THE AUTHORS HAVE REPORTED the results of an extensive survey of the Great Basin region for rubbber-producing plants, begun in 1917 as a war-emergency measure.

During 1918 this broadened into a comprehensive search throughout the West for all species known or suspected to contain rubber. The work is to be continued to determine all the possibilities of rubber production in the West. Rubber was found in 25 of the species examined, although in only four was it high enough to warrant the hope for its recovery on a commercial scale.

NEW TRADE PUBLICATIONS.

THE GILLETTE RUBBER CO., EAU CLAIRE, WISCONSIN, ISSUE AN illustrated catalog of rubber machinery and equipment in a handsome loose-leaf binder. On the covers are views of the exterior and interior of the company's buildings. The catalog contains cuts and descriptions of a mixing mill, inner tube splicing press, wrapping lathe, valve nut tightener, tire stripping stand, bead making machine, tire building stand with foot pedal, core puller; tire-buffing machine and stock racks.

THE LINK-BELT CO., CHICAGO, ILLINOIS, HAS RECENTLY ISSUED two handsome illustrated books devoted to its modern labor-saving equipment. Book No. 375 is a profusely illustrated brochure of 108 pages showing the application of link-belt elevators, conveyors, and other freight and package handling machinery to many varied industries. Among these applications is included an elevator for conveying tire bands, and a conveyor used in assembling electric storage batteries. Book No. 380, of 100 pages, depicts in a similar manner the manifold uses of link-belt hoists and overhead cranes.

THE BULLETIN OF THE CHAMBER OF COMMERCE OF THE UNITED States of America in the Argentine Republic, Volume 1, No. 1, dated August 20, 1919, and two succeeding issues have come to hand. This readable and attractive new publication is devoted to the foreign trade of the United States with particular reference to the Argentine Republic, and will endeavor to give American exporters accurate and helpful information and suggestion for the betterment of commercial relations between the two countries. The rubber and allied industries are identified with the chamber, as seen by consulting the list of officers and members. Among the former may be mentioned the treasurer, Noel F. Tribe, of The First National Bank of Boston, and one of the governors, J. A. Wheatley, of the Ault & Wiborg Co., Cincinnati, Ohio. The 123 active members include the Corn Products Refining Co., Goodyear Tire & Rubber Co. of South America, United States Rubber Export Co., Limited, The First National Bank of Boston, Sucursal Buenos Aires, Westinghouse Electric Export Co., Brunswick-Balke-Collender Co. of New York, Robbins & Myers Co., and the Firestone Tire & Rubber Co.

THE NEDERLANDSCHE GUTTA-PERCHA MAATSCHAPPIJ, THE Hague, Holland, owning factories at Singapore and plantations in the East, is increasing its issued capital to Fl. 1,675,000 ($673,350) by the offer of 250,000 ordinary "A" shares at 200 per cent.

The Question of Tire Guaranties and Adjustments.

FROM THE OUTSET of tire manufacture tire guaranties have been burning questions, and so they still continue. If a tire does not give the guaranteed mileage or better the consumer asserts that the product is faulty, while the manufacturer maintains that it has been abused in use. Each claims that the other is at fault and should stand the loss. To an unprejudiced third party who does not know the facts it seems that both sides make out a good case. What then is the truth of the matter; what has brought such a situation about; how are such differences of opinion possible, and is there a remedy?

During the early years of bicycling, and when the automobile was young, rubber manufacturers knew little about building tires, and had no machinery or other facilities for turning them out in large quantities. But the bicycle and the automobile caught the popular fancy and supplied a genuine economic need. The more serious problems which had previously hampered their development were eliminated by the use of rubber tires and so rapid was the increasing demand and so insistent did it become that rubber companies were forced to experiment and develop their product and methods of manufacture as they went along, with the result that tires have been an ever-changing product in constant process of evolution.

THE DEBATABLE GROUND OF TIRE MILEAGE GUARANTIES.

Some firms succeeded much better than others and by secret and patented processes turned out higher grade tires than their competitors. Seeking to maintain the prestige thus won, and to protect the public against inferior goods, they established guaranties at first based on time and later on mileage.

Although originally instituted with the best intentions, these guaranties soon became the bane of the tire trade and brought about the worst forms of cut-throat competition. There was no uniformity about them, and some firms made the mistake of offering more lavish guaranties in order to get big orders when an attempt to discount the prices of their competitors failed. So reckless did they become that many concerns conducted business at a loss and would gladly have given up half of it to be rid of the guaranty nuisance.

For several years it seemed impossible to get the manufacturers together on a common ground to remedy the evil. In 1896, however, twenty-one leading tire manufacturers were licensed under the Tillinghast patents owned by Colonel Theodore A. Dodge. This and the fact that he was less actively engaged in competition than other tire men gave him a more independent position in the trade. Under his leadership The Rubber Tire Association was organized and a standard form of guaranty was adopted.

Under this guaranty tires showing defective material or workmanship were replaced and all practicable repairs were made free of charge no matter how the injury had been caused, provided the tires were delivered to the manufacturer express prepaid and further that anti-leak preparation had been used. Thus pneumatic tires were at first guaranteed against punctures.

So liberal a guaranty, it was believed, would deter any manufacturer from using poor materials or allowing imperfect workmanship, for it seemed that nobody could afford to offer this guaranty on any but a good tire. And such would probably have been the case had it not been for the loose manner in which the guaranties were made good under the stimulus of keen competition. Whoever needed new tires could usually get them gratis from the manufacturer. This injured retail trade. Moreover, so long as new tires could be had without paying for them, neither the price nor the quality mattered. Prices had to be unnecessarily high in order to cover these inordinate losses, and even then many manufacturers did not break even on their tire business.

Later the guaranty was limited to defective material and workmanship, and cutting of the rim, but punctures were still repaired free. Year by year the terms were still narrowed and the time limit was also shortened. There were guaranties for a year, then for a season, and in 1897 manufacturers began to charge for all repairs.

Several years ago all tire guaranties were placed on a mileage basis, and year by year with better materials and improved methods of manufacture these guaranteed mileages have increased from 1,500 miles at the outset to 5,000 or 6,000 miles for fabric tires and 8,000 to 10,000 miles for cord tires to-day. At first the public manifested some tendency to buy cheap tires, but soon began to learn that the best is the cheapest. The change therefore improved matters considerably, yet it was still possible to get a new tire by claiming defective material or workmanship and paying a small percentage of the full purchase price based on the service mileage obtained from the alleged defectivve tire. Never has there been a greater temptation toward prevarication than has been offered by tire mileage guaranties, and the resulting situation is well shown in King's cartoon in the "Buffalo Express" of August 12, 1919.

Thus while tires generally have improved enormously in quality in recent years, they have been bought by the public not alone on their merit, but to a considerable degree on the liberality of adjustments made by certain companies. Guaranty conditions have been widely violated; the adjustment privilege has been greatly abused, and millions of tires have been sold annually at only a fraction of the full list price. Such a practice of putting a premium on the tricks of motorists and cyclists to replace their damaged and worn-out tires at another's expense has been manifestly unfair to manufacturers and honest consumers, and has kept prices unnecessarily high.

Manufacturers have by no means been ignorant of these abuses, but until recently the peculiar conditions of the trade have been such that neither could these abuses be checked nor the guaranty conditions adequately enforced in making adjustments. Leading makes of tires are now giving such excellent service, however,

that under reduced prices and the increased mileage guaranties and unlimited guaranties covering materials and workmanship during the entire life of the tire which have recently been inaugurated, a marked stiffening up on adjustments has been possible. Honest users are satisfied with this fair treatment, while the avaricious tire users still make unfair claims.

The real trouble is that tire users have from the outset been allowed to expect so much that many have come to believe that to neglect or abuse their tires and have the manufacturer stand the expense is their inalienable right. If such persons will patronize only reputable concerns they will seldom find cause for just complaint. Tire companies of good standing have a reputation to maintain, both for quality of output and fair dealing, and are eager to maintain it. With them tire manufacture has become an exact science. So carefully are materials bought, so rigid is the inspection of materials and workmanship, so greatly improved are the processes of tire building, that a defective tire rarely reaches the consumer. When it does, the defect is obvious to an expert and will be gladly adjusted to the satisfaction of the user. Practical experience has now been sufficient, however, to show exactly how a tire of any given make, type and construction will wear under all conditions, and prevarication is of little avail with an expert adjuster.

The relative merits of the mileage and unlimited guaranty have been much discussed. Both have certain advantages, yet the adjustments now being made under both systems are substantially the same. For many years THE INDIA RUBBER WORLD has asserted that any sort of tire guaranty, aside from the implied assurance that every reputable manufacturer will stand behind his products, is guaranteeing the unguaranteeable, and it still believes that tire guaranties will eventually be abandoned by the trade because from the very character of the service a tire is called upon to perform the duration of that service cannot be foretold.

It is logical enough to guarantee a watch or a clock because one can predict its normal use and treatment. The same is true of a piano or a phonograph, for example. But a tire has no normal career, and calls for a guaranty no more than a suit of clothes or a pair of shoes. When it leaves the factory a dozen different futures may be open to it, involving good or bad roads, careful usage or abuse, proper repair or neglect through ignorance or indifference. It may leave the factory good for 10,000 miles of careful usage, yet everything considered, it is humanly impossible to guarantee half or even one-quarter of that distance. Would it not, therefore, be better for manufacturers to make the best tires possible, and without other than an implied guaranty advertise, for example, that they are averaging 6,000 miles? It would be a welcome relief to the manufacturers, and they could afford to give the consumer still lower prices. It would tend to make the user more careful of his tires, and would make strongly for general veracity and better feeling. There is always the argument that should one firm adopt such a course it would be playing into the hands of competitors who continue their guaranties, but the time will probably come when most leading firms can agree on such a policy and put it over without loss to anybody.

Dunlop Rubber Co. Plans to Enter American Tire Market.

AT AN EXTRAORDINARY MEETING of the Dunlop Rubber Co., Limited, held in London on December 2, 1919, the new chairman, A. I. Ormrod, explained to the shareholders the plan for increasing the capital of the company, which was made public at the close of November and caused some unfavorable criticism.

BIRD'S EYE VIEW OF THE NEW MILLS (42 ACRES OF BUILDINGS) OF THE ENGLISH DUNLOP AT BIRMINGHAM, ENGLAND.

The proposed plan was to increase the capital to £7,500,000 by creating 1,000,000 additional ordinary shares of £1 each, which should be equal to the existing ordinary shares, except that they would draw no dividend that might be declared for the financial year that ended on August 31. The intention was to offer the new shares first to the present holders of ordinary shares on a basis of two new shares for every three old ones; to set aside twenty thousand shares for employes, and if any were left over, to turn them over to the guarantor of the new issue. The holders of preferred stock were to have no special rights to the new issue. It was this exclusion of the preferred stockholders that aroused criticism, and that seems to have led the London Stock Exchange to hold up the issue of the new stock until its requirements are satisfied. No objection seems to be taken to Mr. Ormrod's declaration that a part of the new capital is to be used in a campaign for the American market.

It may be recalled that in 1917, when the Dunlop company made its large increase in capital that brought the amount up to £6,000,000, there were rumors that led the chairman of that day to deny there was any intention of competing in the American market, and to publish the statement that "There is nothing to support the idea that tire makers of Great Britain are combining to fight new foreign competition." Mr. Ormrod, now, after explaining that £1,600,000 of the amount raised is to be

spent on the work at Fort Dunlop, another £1,600,000 in France, and large sums for other needs toward the company's development, states that £1,000,000 are to be employed in America to start, among other things, a rubber plant that shall be the counterpart of Fort Dunlop, with improvements, and that the sum is a mere beginning, because the officials of the Dunlop company are in touch with a leading American banking house regarding the raising of the additional £6,000,000, which will be needed to fully carry out the scheme.

He explained that in 1916, the rights of manufacturing and trading in the United States were bought back from the American Dunlop Co; that a committee of experts sent to the United States this year reported that it is a good time for the extension there of the Dunlop business; that he himself examined conditions in America during the war, although he was not then connected with the Dunlop company. He said, also, that a Dunlop American Trust, Limited, had been formed for the purpose of forming a company in the United States to be called "Dunlop America Limited," or some such title. The plan is for the Dunlop Rubber Co. to take at par 1,000,000 ordinary shares in the American company, one-fourth of the ordinary shares; it will receive also for its trouble 10 per cent of the cost of erecting and equipping a rubber plant, and a royalty on the American net profits. The Dunlop Rubber Co. will also have a right to name a majority of the directors, and if any further increase of the ordinary stock is made by the American company, it must provide that the British company may buy one-fourth of the new stock at par.

The stockholders present applauded the speech and seemed to find no objection to this carefully thought out plan for invading the American rubber market. Mr. Ormrod expatiated on the probable large profits and declared: "American tires will come, anyway—they had better be Dunlop-American."

Since the above announcement was made, there have been incorporated in the United States two new companies under the laws of New York, namely, Dunlop America Limited, and Dunlop Wheel & Rim Co., Inc., details concerning which appear elsewhere in this issue.

Steps are being taken already to have the Canadian company, The Dunlop Tire & Rubber Goods Co., Limited, of Toronto, cooperate in the new plan. The sum of $1,500,000 has been appropriated for erecting a new factory in Toronto. The building, fronting on three streets—Queen, Booth and Natalie—is well under way and is being rushed to completion; it is 400 feet by 80 feet, four stories high above the basement. It will be devoted especially to the manufacture of the Dunlop cord tires, "Traction" and "Ribbed."

BRIEF HISTORICAL REVIEW OF THE DUNLOP COMPANY.

The Dunlop companies have played so important a part in the development of rubber tires that a brief review of their history may be interesting. The invention by Dr. John B. Dunlop of a pneumatic tire for his little boy's bicycle in 1888 was taken up by the late Harvey du Cros at the moment when the bicycle craze was taking hold of England, and the Pneumatic Tyre Co., Limited, was started in Dublin with a capital of £15,000 in 1889. The company was pushed energetically and by 1893, subsidiary companies were started in the United States and in France. In 1896 came the great boom in which Ernest Terah Hooley took a hand and won his notoriety. The Dunlop Pneumatic Tyre Co. was capitalized at £5,000,000, and the pneumatic tire business was so good that Mr. du Cros was able to pull the company through after Hooley's collapse. It is interesting to note that THE INDIA RUBBER WORLD at that time, while warning against the excessive enthusiasm for bicycles, remarked, "The horseless carriage is also coming in for a share of attention, and the makers of tires are hoping for a new field for their industry in equipping these vehicles with rubber."

The American Dunlop Tire Co. lasted till 1901. The *Société Française des Pneumatiques Dunlop*, after the French courts had decided that the Dunlop patents were invalid, was sold to the British company in 1909. In 1899 two other important subsidiary companies were formed—the Dunlop Tire Co. of Canada, Limited (now the Dunlop Tire & Rubber Goods Co., Limited), with £1,000,000 capital, and the Dunlop Pneumatic Tyre Co. of Australasia, Limited, with £120,000. There was also established a Dunlop Pneumatic Tyre Co. (Continental), Limited, in London, which was to acquire the Dunlop branches in Italy, Denmark, Belgium, Holland and Russia. Later a Dunlop Pneumatic Tyre Co., G. m. b. H., was established at Hanau in Germany (1904), and a Dunlop Rubber Co. (Far East), Limited, at Singapore (1909), and near Kobe, in Japan (1910).

As is well known, the Dunlop patent proved of no avail, as Thomson had patented practically the same tire in 1844, and had applied it to carriages. Mr. du Cros, however, soon acquired other important patents, notably the Welsh and the "Clincher," some of them American, and was able to keep the lead in the industry which he had started. In 1904, by which time it was clear that the bicycle trade was declining, he had turned his attention to the possibilities of the fast developing motor trade; the company's capital was then £4,000,000.

After the Dunlop Pneumatic Tyre Co. had become a subsidiary of the Dunlop Rubber Co., the present organization, its capital was reduced. In 1917 there was much activity in the rubber company. The capital stock was increased to £6,000,000, by creating £3,000,000 of 7 per cent preference shares, which were in addition to £1,000,000 of 6½ per cent preference shares created the year before. Moreover, there were rumors that brought out the statement that the increase was not intended "To support the idea that the tire makers of Great Britain are combining to fight new foreign competition." Later there was uneasiness because a firm of brokers was believed to have bought £4,000,000 ordinary shares of Dunlop for financial interests that were not in harmony with the persons who controlled the company.

It should be noted that the additional £1,000,000 shares to be offered now are expected to bring in, not their par value, but £8,000,000.

In 1913 the works at Fort Dunlop were begun. This is a plot of land containing 290 acres, about five miles from Birmingham, close to the canal and the railway. The buildings already put up on this ground cover more than 27½ acres and will soon cover more than 40 acres. In 1914 the company began to build its own cotton mills, and at present the Dunlop company's cotton mills are valued at £3,000,000.

BONUSES FOR SALARIED RUBBER EMPLOYES.

As a holiday remembrance the United States Rubber Co., New York City, gave to its salaried officers and employes in this country, including subsidiary companies, a bonus of 10 per cent of their salaries, if not exceeding $2,000 annually. All those receiving higher salaries were given $200. About 7,500 persons were benefited by this Christmas gift.

The B. F. Goodrich Rubber Co., announces that 25 per cent of their annual pay will be given to all salaried employes this year. Approximately $2,500,000 will thus be distributed to about 7,500 employes.

THE MASON TIRE & RUBBER CO., KENT, OHIO, ANNOUNCES AN unlimited mileage guarantee stating that no matter how far a Mason tire has run, if it should develop any defect in material or workmanship, it will be adjusted fairly on the basis of the service it would have given had the defect not existed.

AT AN EXHIBITION HELD FOR FOUR DAYS DURING THE MONTH of August at Tjiandoer, Java, the *Naamloose Vennootschap Rubber en Handel Maatschappij Tjiandoer* of Pasir Hajam had an exceptionally fine display of inland crude rubber samples.

News of the American Rubber Trade.

DIVIDENDS.

THE AMERICAN CHICLE CO., NEW YORK CITY, has declared its quarterly dividend of one and one-half per cent, payable January 2, 1920, on preferred stock of record December 20, 1919.

Ames Holden McCready, Limited, Montreal, Quebec, has declared its quarterly dividend of one and three-quarters per cent, payable January 2, 1920, on preferred stock of record December 19, 1919.

The American Zinc, Lead & Smelting Co., St. Louis, Missouri, and Boston, Massachusetts, has declared its quarterly dividend of $1 per share, payable February 2 on preferred stock of record January 23, 1920.

The Apsley Rubber Co., Hudson, Massachusetts, has declared its semi-annual dividend of three and one-half per cent, payable January 1, 1920, on preferred stock of record December 31, 1919.

The Brunswick-Balke-Collender Co., Chicago, Illinois, has declared its quarterly dividend of one and three-quarters per cent, payable January 1, 1920, on preferred stock of record December 20, 1919.

The Canadian Westinghouse Co., Limited, Hamilton, Ontario, has declared a quarterly dividend of one and three-quarters per cent and an extra dividend of one per cent, both payable January 1, 1920, on stock of record December 19, 1919.

The Corn Products Refining Co., New York City, has declared an initial regular quarterly dividend of one per cent and an extra dividend of one-half of one per cent on common stock; also, a regular quarterly dividend of one and three-quarters per cent on preferred stock; all payable January 20 on stock of record January 5, 1920.

The Driver-Harris Co., Harrison, New Jersey, has declared quarterly dividends of two per cent on common stock, and of one and three-quarters per cent on preferred stock, both payable January 2, 1920, on stock of record December 22, 1919.

E. I. du Pont de Nemours & Co. (incorporated), Wilmington, Delaware, has declared a quarterly dividend of one and one-half per cent on debenture stock of record January 10, payable January 26, 1920.

The Firestone Tire & Rubber Co., Akron, Ohio, has declared the following dividends: two per cent special, payable December 20 on stock of record December 15, 1919; one and one-half per cent quarterly, payable January 15 on six per cent preferred stock of record January 1, 1920; and one and three-quarters per cent quarterly, payable February 15 on seven per cent preferred stock of record February 5, 1920.

The First National Bank, Boston, Massachusetts, has declared the following dividends: quarterly, at five and four per cent on stock of record December 31 and December 24, 1919, respectively, both payable in January, 1920; extra, one per cent, payable January 2, 1920, on stock of record December 24, 1919.

The General Tire & Rubber Co., Akron, Ohio, has declared quarterly dividends of one and three-quarters per cent, payable January 2, 1920, on common and preferred stock, respectively, of record December 20, 1919.

The B. F. Goodrich Co., Akron, Ohio, has declared a quarterly dividend of $1 per share, payable February 16 on stock of record February 5, 1920.

The Hodgman Rubber Co., Tuckahoe, New York, has declared a dividend of $1.13 on preferred stock of record January 15, payable February 1, 1920.

The Keystone Tire & Rubber Co., Inc., New York City, has declared a quarterly dividend of three per cent on stock of record December 15, 1919, payable January 2, 1920.

The McLean Tire & Rubber Co., East Liverpool, Ohio, has declared dividends of four and one-half and three and one-half per cent, respectively, on common and preferred stock, payable December 30 on stock of record December 20, 1919.

The Madison Tire & Rubber Co., Buffalo, New York, has declared its initial quarterly dividend of two per cent, payable January 2, 1920, on preferred stock of record December 24, 1919.

The Mt. Vernon-Woodbury Mills, Inc., Baltimore, Maryland, has declared its semi-annual dividend of three and one-half per cent on preferred stock of record December 21, 1919, payable January 15, 1920.

The National Aniline & Chemical Co., New York City, has declared its quarterly dividend of one and three-quarters per cent on preferred stock of record December 15, 1919, payable January 1, 1920.

The Portage Rubber Co., Akron, Ohio, has declared its quarterly dividend of one and three-quarters per cent on preferred stock of record December 20, 1919, payable January 1, 1920.

The Tropical Tire & Rubber Co., 51 Leonard street, New York City, has declared its semi-annual dividend of four per cent on Class A stock of record December 10, 1919, payable January 2, 1920.

The United Shoe Machinery Corp., Boston, Massachusetts, has declared the following dividends: one and one-half per cent on preferred stock and fifty cents per share on common stock, both payable January 5, 1920, on stock of record December 16, 1919.

The Westinghouse & Electric Manufacturing Co., East Pittsburgh, Pennsylvania, has declared the following quarterly dividends: two per cent on common stock of record January 2, payable January 31; one per cent on preferred stock of record January 2, payable January 15, 1920.

The Winnsboro Mills, Winnsboro, South Carolina, have declared a quarterly dividend of one and three-quarters per cent on preferred stock of record December 24, payable January 1, 1920.

FINANCIAL NOTES.

The Boston Belting Co. has asked permission to increase its authorized capital stock from 10,000 to 15,300 shares. The new capital will consist of 10,300 preferred shares of $50 par, and 5,000 common shares of $100 par. Preferred dividends will be cumulative at 7 per cent.

Thomas Clements, comptroller of the Firestone Tire & Rubber Co., has announced the purpose of the Firestone company to build a million-dollar plant in Singapore for the preparation of crude rubber for manufacture into tires.

The business of the Firestone Tire & Rubber Co. for the year ended October 31, totaled $91,078,513, an increase of 20 per cent over that of the previous year. The company is behind on its orders and there is every reason to expect continued growth and prosperity during 1920.

Common no-par stock of the Victor Rubber Co., Springfield, Ohio, recently offered to the public in Cleveland, was rapidly taken at $35 per share. Of the 50,000 shares of this stock authorized to be issued, only 35,000 are at present being offered.

It will be noted in the following statement that the Perfection Tire & Rubber Co. has no bonded mortgage or preferred stock indebtedness and that the fixed and liquid assets have shown an increase in the first five months of this year of $1,522,512.62. Regarding income, profit and loss for the first five months of this year, a comparison of the figures shows very substantial

increases, as indicated by the surplus account and other items covering liquid assets, especially in consideration of the fact that the Government war restrictions were not removed until December 15, 1918. The net profits for the month of May amounted to $60,102.20. These earnings are from "Perfection" products alone and do not include profits from outside contracts.

ASSETS.	January 1, 1919.	May 1, 1919.	June 1, 1919.
Cash on hand and in banks.	$12,950.00	$137,327.85	$213,359.02
Trade acceptances—notes and accounts receivable (less reserve for bad accounts).	182,565.83	341,672.79	481,978.56
Liberty bonds	1,500.00	3,650.00	3,650.00
Inventories:			
Raw material—finished goods —work in process	505,141.51	580,403.92	815,902.15
Investments—real estate and housing account, Dickinson Cord Tire Corp.	78,644.58	364,163.72	378,337.38
Fixed assets—buildings, land, machinery and equipment (less reserve for depreciation)	905,438.12	1,009,018.73	1,297,291.83
Due from fiscal agents	2,365,724.08	1,614,485.73	1,013,507.48
Deposits on new equipment.	3,400.00	30,369.28	11,781.57
Patents, contracts, trade marks, good will, organization expense	11,314,874.91	11,310,476.60	11,353,492.53
Prepaid charges	6,454.68	11,462.34	16,306.83
In suspense		210.00	
Totals	$15,376,693.71	$15,403,240.96	$15,567,607.35
LIABILITIES.			
Notes and accounts payable..	$271,509.27	$208,190.10	$318,966.16
Notes receivable discounted.		6,247.00	
Reserve for liabilities and taxes	6,000.00	7,004.82	7,854.97
Deferred payments on real estate	6,600.00	6,600.00	5,498.00
Capital	15,000,000.00	15,000,000.00	15,000,000.00
Surplus and undivided profits	92,584.44	175,199.04	235,288.22
Totals	$15,376,693.71	$15,403,240.96	$15,567,607.35

Goodyear Tire & Rubber Co. of Canada voted December 13 to increase its authorized capitalization from $3,000,000 to $30,000,000, divided into $15,000,000 common and $15,000,000 cumulative preferred.

Four-fifths of the 40,000 additional shares issued by the Lee Rubber & Tire Corp., had been taken up at $33 a share by its shareholders by December 1, with the prospect that the same will be done with most of the remainder. The company's earnings for 1919 are estimated at $600,000 after taxes and charges are paid. If earnings increase next year by 75 per cent, as is anticipated, it is probable that payment of dividends will be resumed soon.

In order to provide funds for building and equipping a manufacturing plant at Stamford, Connecticut, and for other corporate purposes, the Carlisle Tire Corp., New York City, is offering for subscription shares of its 8 per cent cumulative preferred stock at par, accompanied by a substantial bonus of no-par-value common stock. The bonus, however, is subject to reduction without notice.

The company owns a 10-acre plant site at Stamford affording ample room for the erection of ten factory units, each having an output of 400 tires a day. Pending the erection of the new plant, Carlisle cord tires will continue to be manufactured in the leased plant at Andover, Massachusetts.

Lee, Higginson & Co., bankers, Boston, Massachusetts, announces the issuance of $4,000,000 of 7 per cent cumulative preferred stock of Winnsboro Mills, a Massachusetts corporation with a plant at Winnsboro, South Carolina. Cord fabric for automobile tires is the product manufactured and the plant is to be enlarged at a cost of about $3,000,000 to supply the increased demand of the United States Rubber Co., which buys the entire output of these mills under a contract running until 1927. The officers and directors of Winnsboro Mills are S. Harold Greene, president; Henry C. Everett, Jr., treasurer; Charles L. Talbot, clerk; Robert E. Barwell and Frank J. Hale.

NEW INCORPORATIONS.

Amalgamated Tire Stores Corp., October 27 (New York), $3,000. S. Newman, 233 West 54th street; J. T. McGovern, 141 Broadway; E. D. Newman, 55 Liberty street—all of New York City. Principal office, 1974 Broadway, New York City. To sell tires.

Anniston Tire & Rubber Co., Inc., October 7 (New York), $6,000. J. Jacobs; S. Bernheim; W. Loewenthal—all of 1877 Broadway, New York City. To manufacture tires.

Brewster Tire Service, Inc., December 22 (New York), $5,000. S. S. Braunberg, 483 Ninth street, Brooklyn; G. F. Brewster, Hotel Gramercy; W. R. Rosenkranse, 322 East 19th street, both of New York City—all in New York. To repair tires.

Buckeye Rubber Products Co., September 11 (Ohio), $2,500,000. C. H. Roth, president and general manager; W. Norris, vice-president; J. M. MacKay, treasurer and sales manager; C. V. Goepper, secretary. Principal office, National City Building, Cleveland, Ohio. Factory, Willoughby, Ohio. To manufacture molded rubber goods, etc.

Burnet-Webb Tire Corp., December 5 (New York), $10,000. J. H. Burnet, 816 Bellevue avenue; A. E. Webb, 707 Park street; W. E. Housel, 706 Wilder Building—all of Syracuse, New York. Principal office, Syracuse, New York. To manufacture auto tires, etc.

Colonial Cycle Supply Co., Inc., November 1 (New York), $50,000. G. M. Port, president and purchasing agent; N. A. Port, vice-president and treasurer; B. M. Port, secretary. Principal office, 35 Murray street, New York City. To manufacture auto and bicycle supplies.

Courier Rubber Co., Inc., The, October 14 (New York), $150,000; R. E. Clift, 112 East 17th street; C. P. Brown, 10 Wall street, both of New York City; W. D. Laurie, Montclair, New Jersey. To manufacture tires.

Delion Tire & Rubber Co., June 1 (Maryland), $10,000. F. G. Hilken and W. A. Rodgers, both of 133 West Mount Royal avenue; E. A. Strauff, 3 East Lexington street, all in Baltimore, Maryland. Principal office, 133 West Mount Royal avenue, Baltimore, Maryland. To manufacture tires and tubes.

Diadem Leather Co., October 27 (Maine), $1,000,000. J. M. Roche, president; A. C. Libby, treasurer; S. A. Paul, clerk—all of Portland, Maine. Principal office, Portland, Maine. To manufacture and deal in all kinds of rubber and leather goods.

Dunlop America Limited, December 5 (New York), $500. F. R. Butehorn, 764 St. Johns Place, Brooklyn; R. S. Baker, 37 Wall street; E. S. Hawley, 50 Vanderbilt avenue, both of New York City—all in New York. To manufacture auto tires.

Dunlop Wheel & Rim Co., Inc., December 19 (New York), $500. R. S. Baker, 37 Wall street; E. S. Hawley, 50 Vanderbilt avenue, both of New York City; F. H. Butehorn, 764 St. Johns Place, Brooklyn—all in New York. To manufacture auto accessories.

Fabric Innershoe Corp., November 29 (New York), $200,000. G. T. Fish; W. W. Sutton, Jr.; B. H. Engelke—all of 15 Broad street, New York City. To manufacture tire reliners, etc.

Garden Tire & Rubber Co., Inc., October 14 (New York), $5,000. J. Jacobs; W. Loewenthal; S. Bernheim—all of 1877 Broadway, New York City. To manufacture tires, etc.

Gillette Tire Co., Inc., December 15 (New York), $200,000. B. J. and M. R. Shafer, both of East Orange, New Jersey; H. F. Rudiger, Lynbrook, New York. To manufacture tires.

Goodwill Rubber Co., Inc., October 20 (New York), $1,000. W. W. Reeves; P. D. Benson; A. E. Claffey—all of 154 Nassau street, New York City. To do a tire business.

Henderson Tire Export Co., Inc., December 23 (New York), $25,000. P. A. Zizelman, 38 Park Row; H. P. Hill, 1482 Broadway; R. C. Owens, Wallick Hotel—all of New York City. To deal in tires.

Hindman, Dudde, Lyle, Inc., October 16 (New York), $20,500. C. A. Hindman, 565 West 192nd street; W. Dudde, 1060 Woodycrest avenue, both of New York City; M. E. Lyle, Hackensack, New Jersey. To deal in tires.

K. & S. Tire & Rubber Goods, Ltd., October 16 (Canada), $3,500,000. W. J. Sheppard, Waubaushene; J. B. Tudhope, M. P. Orilla; D. L. White, Midland; T. H. Sheppard, Toronto; J. O'Mara, Toronto; H. J. Daly, Toronto; J. P. Bickell, Toronto—all in Ontario, Canada. To manufacture tires and rubber goods.

King Leather Tire Co., November 24 (Delaware), $1,000,000. M. L. Rogers, L. A. Irwin, W. G. Singer—all of Wilmington, Delaware. To manufacture automobile tires and other accessories.

Kinzie Rubber & Manufacturing Co., October 25 (Illinois), $350,000. E. C. Klauber, president, treasurer and purchasing agent; H. T. Kessler and L. J. Ulber, vice-presidents; G. F. Gabel, secretary. Principal office, 1514 West Kinzie street, Chicago, Illinois. To manufacture raincoats, rubber sheeting and rubber cements.

Kraus Tire Co., Inc., J. H., December 8 (New York), $25,000. J. H. Kraus, Rochester; M. L. and S. R. Armstrong, both of Caledonia—all in New York. Principal office, Rochester, New York. To deal in tires.

Long Distance Tire & Rubber Co., Inc., The, October 20 (New York), $200,000. B. Gunner, 200 West 111th street; L. Victor, 1972 Seventh avenue; M. T. Newmark, 988 Tiffany street—all in New York City. To deal in tires.

Master Grip Rubber Co., The, November 17 (California), $100,000. J. D. F. Jennings, I. W. Hellman. Principal office, Los Angeles, California. To deal in tires.

Monarch Rain Coat Co., Inc., December 24 (New York), $15,000. M. Rubin, 1416 43d street; M. Rosenstein, 480 Junius street, both of Brooklyn; S. Kaplinsky, 1569 Hoe avenue, Bronx—all in New York. To manufacture raincoats, etc.

Montana Tire Co., May 20 (Montana), $500,000. C. J. Drope, Akron, Ohio; J. R. Swan, secretary and treasurer; F. C. Plouf, A. S. Dowall, Jr., G. C. C. Stenning, directors—all of Great Falls, Montana. Principal office, 409 Central avenue, Great Falls, Cascade County, Montana. To manufacture tires, tubes and rubber sundries.

Paducah Tire Co., Inc., October 7 (New York), $3,000. J. Jacobs, W. Loewenthal, S. Bernheim—all of 1877 Broadway, New York City. To manufacture tires.

Pond Electric & Battery Service, Inc., December 15 (New York), $200,000. F. O. Pond; F. R. Kirk, V. E. Mather—all of Malone, New York. Principal office, Malone, New York. To manufacture tires and batteries.

Rawhide-Tire Corp., December 24 (New York), $20,000. L. Loeb, H. H. Levin, A. H. Friedman—all of 5 Beekman street, New York City. To deal in tires.

Record Tire & Mfg. Co., October 22 (Delaware), authorized capital, 50,000 shares without nominal or par value. T. L. Croteau, P. B. Drew, H. E. Knox—all of Wilmington, Delaware. Delaware agent, Corporation Trust Co. of America, Du Pont Building, Wilmington, Delaware. To manufacture and deal in tires and tubes.

Salvage Tire Co., Inc., October 14 (New York), $100,000. G. T. Fish, B. H. Engelke, W. W. Sutton, Jr.—all of 15 Broad street, New York City. To manufacture and rebuild tires.

Schlissel Safety Tire Protector Co., Inc., December 16 (New York), $500,000. L. Schissel, 640 McDonald street; R. Kestler, 174 South Ninth street, both of Brooklyn; R. Oelkers, 838 West End avenue, New York City—all in New York. To manufacture tires, protectors, etc.

Stoddard Tire & Rubber Corp., December 10 (New York), $500,000. C. H. Stoddard, Navy Yard, Brooklyn; J. A. Sands, F. D. Yates, both of 150 Nassau street, New York City—all in New York. To manufacture tires, etc.

Strongcord Tire & Rubber Manufacturing Co., November 15 (Indiana), $250,000. S. W. Stermont, A. Conen, F. B. Mesker, D. Chappell, C. Haase—all of Evansville, Ind. Principal office, Evansville, Indiana. To manufacture rubber tires and other rubber goods.

Stuart Puncture Proof Liner & Tire Co., The, September 24 (Oregon), $50,000. C. A. Stuart, president; M. P. Chapman, vice-president; E. J. Noble, secretary; T. P. Randall, treasurer; B. J. Statts, manager. Principal office, Oregon City, Oregon. To manufacture and sell a puncture proof liner and tire for pneumatic automobile tires.

Trent Rubber Co., September 29 (New Jersey), $500,000. H. A. Ludeke; I. A. Worthington, both of Trenton; K. Keller, Hoboken—all in New Jersey. Principal office, 26 West State street, Trenton, New Jersey. Agent in charge, M. G. Buchanan. To manufacture, purchase and sell tires, tubes, etc. (Formerly The Atlas Tire & Rubber Co.)

United States Puncture-Proof Co., November 22 (Delaware), $5,000,000. W. F. O'Keefe; G. G. Steigler, J. H. Dowdell—all of Wilmington, Delaware. To manufacture inner tubes, casings, etc.

Wildman Rubber Co., The, November 8 (Delaware), $10,000,000. W. W. Wildman, 160 Calvert avenue; L. C. MacGregor, both of Detroit; H. P. Orr, Lansing—all in Michigan. Delaware agent, Corporation Trust Co. of America, Du Pont Building, Wilmington, Delaware. To manufacture and sell all kinds of automobile tires, tubes and other rubber goods.

World Rubber Products Co., November 24 (Delaware), $1,500,000. M. L. Horty, M. C. Kelly, S. L. Mackey—all of Wilmington, Delaware. Delaware agent, Delaware Charter Guarantee & Trust Co., Du Pont Building, Wilmington, Delaware. To manufacture rubber goods, etc.

Y. S. Skin Mechanical Tubeless Tire Co., Inc., December 26 (New York), $10,000. A. Abramson; B. Perlman, both of 299 Broadway; H. Y. Skin, 55 Barclay street—all in New York City. To manufacture tires, etc.

HIGHEST PRICES PAID TO RUBBER WORKERS.

Men who work in rubber factories earned the highest average wages per hour and per week in the United States in 1919 and receive the highest percentage of increase since the war began; the women rubber workers, who are less favored, receive the second highest weekly wages in the eight industries examined by the National Industrial Conference Board in its "War-time Changes in Wages."

In September, 1914, the male workers in rubber factories were receiving 28.8 cents an hour and $14 a week; the boot and shoe men did better, both by the hour and week; and the metal workers received a shade more an hour. In September, 1918, the rubber workers received 57.5 cents an hour and $28.60 a week and in March, 1919, 61.2 cents an hour, the highest hourly earnings in any of the industries, and $29.35 cents a week, far ahead of all other workers. The figures in the same period for the men cotton workers, who receive the lowest wages, were 18.9 cents per hour and $10 per week in September, 1914; 38.5 cents and $20.60 a week in September, 1918, and 38.9 cents an hour and $17.10 a week in March, 1919.

The rubber men received 100 per cent increase in 1918 and 112 per cent in 1919 over 1914 in the hourly rate of pay, but 104 per cent increase in 1918 and 110 per cent in 1919 in weekly wages over 1914. The percentages of increase per hour for the cotton men was 104 in 1918 and 106 in 1919 over 1914, but it left them still lowest in the scale; while the percentage of increase per week, which was 106 in 1918 dropped to 71 in 1919. The chemical workers in the same time rose from 23.2 cents an hour in 1914 to 44.5 cents in 1918 and 49 cents in 1919; their weekly wages increased from $12.85 in 1914 to $26.80 in 1918, dropping to $26.20 in 1919.

Women workers in rubber in 1914 received 17.4 cents an hour; this became 24.7 cents in 1918 and 29.2 cents in 1919, leaving them the worst paid per hour in any of the eight industries examined and with the lowest percentage of increase. Their weekly wages of $9.25 were the highest paid to women in 1914; the increase to $12.94 in 1918 left them at the bottom of the list, while the further increase to $14.90 in 1919 makes them second only to the silk workers. In the same time the women cotton workers, earning 15.2 cents an hour in 1914, rose to 30.4 cents in September, 1918, and to 31.2 cents in March, 1919; their average weekly earnings of $7.70 in 1914 became $15.37 in 1918 and sank to $12.75 in 1919.

The percentage increases in earnings of piece workers were greater than those of time workers and the actual earnings were also greater in many cases.

VICE-PRESIDENT OF ARTHUR W. STEDMAN, INC.

ARTHUR W. STEDMAN, JR., mining engineer and crude rubber broker, was born February 15, 1894, in Brookline, Massachusetts, which town was founded by his ancestor in 1705. First attending Volkman's School for Boys, he later entered the Groton School, where he prepared for Harvard College.

A. W. STEDMAN, JR.

His mind being centered on making mining engineering his life's work, he decided upon a course at the Colorado School of Mines, where he passed three years, and was in his last term when the World War was declared.

He served with the Colorado Corps of Engineers during the summer of 1916, took examinations for the Regular Army that fall, and was commissioned a second lieutenant. After further training at Camp Leavenworth he became first lieutenant. He was later transferred to Fort Oglethorpe where he served until January, 1918, when he received an honorable discharge for illness. After recovery, two months later he enlisted in the Tank Corps, soon becoming sergeant and accompanying the corps to France, where he served until June, 1919.

After pursuing the engineering profession for a time he entered the crude rubber business, and was made vice-president of the well-known firm of Arthur W. Stedman, Inc., 68 Broad street, New York City, of which his father is president.

PERSONAL MENTION.

R. W. Ashcroft has resigned as advertising manager, effective December 31, 1919, of the United States Rubber Co. He states that his future business plans have not been decided upon.

H. Tyler Kay, who has been engaged in advertising work during the last seven years with the Milwaukee "Journal," and with the Nemours Trading Corp., New York, and who was discharged from the army a short time ago, has been made advertising manager of The Madison Tire & Rubber Co., Inc., New York City.

George H. Jacobs, Akron manager for L. H. Butcher Co., Inc., was in New York City last month on a combined business and pleasure trip.

I. F. Baker of the Westinghouse Electric International Co., who has been located in the New York office for the past two years, is now on his way to Tokio, Japan, where he will act as a special representative of the company.

Charles C. Spies has been appointed district sales representative for the Faultless Rubber Co., Ashland, Ohio, in the Philadelphia territory, with headquarters at 887 Drexel Building, Philadelphia, Pennsylvania. He formerly traveled for the company in Ohio, New York, and New England.

Henry E. Balsley has been appointed manager of the Chicago office of the Hooven, Owens, Rentschler Co., Hamilton, Ohio.

E. S. Cooley has been appointed manager of the New York office of the Hooven, Owens, Rentschler Co., Hamilton, Ohio.

W. W. Wildman, former president and general manager of the Portage Rubber Co., Akron, Ohio, is organizing in Detroit, Michigan, a new $10,000,000 corporation to be known as the Wildman Rubber Co.

EASTERN NOTES.

The General Electric Co., Schenectady, New York, has acquired the plant of the Symington Works, Leighton avenue, Rochester, New York, comprising about 125,000 square feet of floor space, to be used for the manufacture of electrical goods. The company will also open a factory at Providence, Rhode Island, for the manufacture of small electrical devices, and will construct a large machine shop at Erie, Pennsylvania.

The Link-Belt Co., Nicetown, Philadelphia, Pennsylvania, is planning a new office at its Philadelphia works, the present office to be remodeled into a shop extension.

The Consumers Tire & Rubber Co., 16 Beaver street, New York City, has increased its capital stock from $100,000 to $1,500,000.

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, will build a two-story addition to its plant at Essington, in the same state, 130 by 500 feet, at an estimated cost of $500,000, including equipment.

The Westmoreland Chemical & Color Co. has removed its general office to the southeast corner of 22d and Westmoreland streets, Philadelphia, Pennsylvania.

The Vulcan Rubber Co., Erie, Pennsylvania, will build a factory addition for the manufacture of cord tires on West Lake Road. The addition will be two stories high, of steel, brick, and concrete, and the machinery and equipment have been ordered. The company is at present at work on a government order for tires to equip all postoffice automobiles east of the Mississippi river.

The Achilles Rubber & Tire Co., Inc., Binghamton, New York, which was reorganized in January, 1919, has been producing tires, tubes, mechanical goods and belting since August of this year, mostly for export. Plant additions are now being made which will give a capacity of 800 tires and tubes daily. The mechanical department is also being enlarged and plans are being drawn for further factory additions. The officers of the company are H. J. Smith, president; A. W. Caney, vice-president; G. L. O'Neil, secretary and treasurer.

The Hooven, Owens, Rentschler Co., Hamilton, Ohio, manufacturer of steam engines, compressors, etc., has opened branches at 2129 Land Title Building, Philadelphia, Pennsylvania, and in Richmond, Virginia, in charge of C. M. Decker and E. H. Fairchild, respectively.

The Motor and Accessory Manufacturers' Association will hold its annual banquet at the Hotel Commodore, New York City, Wednesday, January 7, at 7.30 p. m.

The following members of the Motor and Accessory Manufacturers' Association allied to the rubber industry will exhibit at the New York automobile shows: Breeze Manufacturing Co., Essankay Products Co.; General Electric Co.; Morse Chain Co., A. Schraders' Son, Inc.; C. A. Shaler Co.; Story Rubber Co.; Westinghouse Electric & Manufacturing Co.; William-Seaver-Morgan Co.

The Atlantic Rubber Manufacturing Corp., 239 Fourth avenue, New York City, has acquired the entire capital stock of the Traun Rubber Co. and consolidated its business with its own, taking over and assuming all the assets and liabilities of the acquired business. The officers and management of the Atlantic company will remain the same.

As the first of a number of welfare projects in the interest of its employes, the Ajax Rubber Co., New York City, announces that an extensive insurance plan has been put into effect. The policies cover every individual in the organization whose service extends over a period of three months or more. By this insurance, which is the gift of Ajax to its workers, every man and woman in both the Trenton, New Jersey, and Racine, Wisconsin, factories, and sales offices, and all other people in general will benefit.

THERMOID SALES MANAGER.

JOHN T. SPICER, who has been made sales manager of the Thermoid Rubber Co., Trenton, New Jersey, is a splendid example of the self-made man with an inflexible determination to succeed.

JOHN T. SPICER.

After completing grammar school and attending high school two years, he entered Exeter Preparatory School, where he remained two years. Part of one year he attended States School, and from there entered the employ of the Maddock Pottery Co., of Trenton, as stock clerk. During this period he attended night school for one year and then took a finishing course at a West Philadelphia, Pennsylvania, school of business, later completing a full course in advertising in a correspondence school.

Winning promotion to the office of the Maddock Pottery Co., he remained there three years, when he was made a salesman in the western territory for four years. Meanwhile between trips he assisted in compiling the firm's catalogs and in planning its advertising.

Early in 1918 he resigned to become assistant advertising manager of the Thermoid Rubber Co. In October of the same year he was promoted to the position of advertising manager and has since assumed the duties of sales manager.

THE RUBBER TRADE IN NEW JERSEY.

By Our Regular Correspondent.

TRENTON NOTES.

THE COAL SITUATION kept rubber manufacturers guessing for a few days and resulted in the Empire Rubber & Tire Corp. appealing to the Government for a supply of bituminous fuel to keep the plant going. The company had but a few days' supply on hand, several carloads having been commandeered by the United States Railroad Administration. The Government finally released the coal. The other Trenton rubber concerns had larger supplies on hand, but were preparing to operate only three days a week when the ban was lifted.

Charles Howell Cook, treasurer of the Hamilton Rubber Manufacturing Co., Trenton, has been made president of the Mercer County Tuberculosis League. Mr. Cook recently devoted considerable time to visiting factories with physicians to give talks on the health of workmen and the improvement of sanitary conditions. Many of the Trenton rubber concerns also contributed financially towards the work.

Henry Young, of Trenton, has been made vice-president of the Hamilton Rubber Manufacturing Co. to fill the place made vacant by the death of William H. Servis. No other changes were made in the management.

The office force of the Thermoid Rubber Co., Trenton, held its annual Christmas dinner and minstrel show at Hildebrecht's Restaurant on December 22. About 150 persons were present, including Robert J. Stokes, secretary of the company; John T. Spicer, general sales manager, and Edmund W. Craft, purchasing agent. Harry McGowan, Warren C. Hunt, Fred C. Birkholtz, Harry W. Searfoss and Mr. and Mrs. A. H. Greywacz contributed vocal and instrumental selections. Miss Marjorie Pilger was chairman of the general committee.

The Globe Rubber Tire Manufacturing Co., Trenton, has contracted with I. Harper Clayton for a one-story building adjoining the plant on Prospect street, to cost $6,300.

The Ajax Rubber Co., Trenton, has taken out a permit for the erection of an addition to the plant on Breunig avenue. The new structure will be three stories high, 60 by 350 feet, and will cost $39,000. The plans have been drawn and the work will be started as soon as bids are received and contracts let.

Clifford H. Oakley, president of the Essex Rubber Co., Trenton, has been made president of the Trenton Council of Boy Scouts of America. Mr. Oakley has long been interested in all kinds of welfare work for boys. He was chairman for Trenton in last spring's drive in behalf of the National Association of Scouting, and pushed Trenton to the head of the list of New Jersey cities. Mr. Oakley is especially interested in water sports for boys and he will now help in the formation of a sea scout crew at Trenton. Charles Howell Cook, treasurer of the Hamilton Rubber Manufacturing Co., has contributed a clubhouse along Sanhicak Creek for the use of the boys.

The annual meeting of the Trenton Rubber Manufacturers' Association, held on December 8 at the Trenton County Club, was largely attended. The association comprises Trenton, Philadelphia and Wilmington, Delaware, rubber manufacturers. Following a business meeting a banquet was served. Important business relating to the rubber industry was transacted and the following officers were elected: president, John S. Broughton, of the United & Globe Rubber Co.; vice-president, Charles E. Stokes, of the Home Rubber Co.; secretary, Robert J. Stokes, of the Thermoid Rubber Co.; treasurer, Alfred Whitehead, of Whitehead Brothers' Rubber Co.

The Pocono Rubber Cloth Co., recently chartered with a capital of $500,000, will soon engage in the manufacture and sale of rubber goods at 137 East State street, Trenton. Robert R. Gulliver, of Trenton, and Neil E. Bowman and Theodore S. Cart, both of Mount Vernon, New York, are the incorporators.

MISCELLANEOUS NEW JERSEY NOTES.

The United States Rubber Co., New Brunswick, New Jersey, has come to the aid of its employes and is selling to each two pounds of brown sugar. Bags containing 1,200 pounds were sent to the factory for distribution.

The Howe Rubber Co., of New Brunswick, New Jersey, manufacturer of tires and tubes, is offering for sale 10,000 shares of preferred stock and a like amount of common stock. The company's earnings during the past year are stated as $2,500,000.

William Henry Sayen, Jr., treasurer of the Mercer Rubber Co., Hamilton Square, New Jersey, has just been awarded the Croix de Guerre by Marshal Petain for extreme bravery while under fire. Mr. Sayen was a Y. M. C. A. worker and was constantly under bombardment during his stay overseas. Osgood Sayen, brother of W. H. Sayen, Jr., who was formerly with the Mercer Rubber Co., is now an officer in the French navy.

Philip H. Lang has been promoted from the position of New York branch manager to that of district manager for the Empire Rubber & Tire Corp., Trenton.

Frank Wallace Servis, Bloomfield, New Jersey, has been made administrator of the estate of his father, William H. Servis, who died some time ago. Mr. Servis owned a beautiful home in Trenton and other real estate.

The Duratex Co., Newark, has awarded a contract to the American Concrete Steel Co. for the erection of a rubber mill to cost $175,000.

The Rydon Tire & Rubber Co., Asbury Park, New Jersey, has plans drawn for a brick and steel factory to cost $100,000.

Robbers recently burglarized the store of the Joseph Sesta Tire Co. at Red Bank and escaped in a motor truck with $30,000 worth of automobile tires.

The plant of the Johnson Rubber Co., situated in Ewing township, New Jersey, was destroyed by fire on December 12. Antonio De Piano, manager of the plant, was filling a gasoline tank when it exploded. He was fatally burned and died a week later. The plant was one story and measured 60 by 60 feet. About 250 gallons of oil were burned. The plant was owned by the Ivens Machine Co. and will be rebuilt.

The Weldon Roberts Rubber Co., manufacturer of stationers' sundries, Newark, New Jersey, reports that notwithstanding the disadvantage to the foreign buyer in the matter of exchange, the company is experiencing an unprecedented demand for its products, particularly erasers, in foreign countries. Large shipments have recently been made to Italy, Argentina, Great Britain, Russia, Japan, Australia and China.

Fifteen hundred and one shares of stock of the Boonton Rubber Manufacturing Co., Boonton, New Jersey, were sold November 25, 1919, to R. W. Seabury for $1,501 by Francis P. Garvan, Alien Property Custodian.

THE RUBBER TRADE IN MASSACHUSETTS.

By a Special Correspondent.

NEW ENGLAND has always been the rubber footwear center of the United States, and the State of Massachusetts takes the lead. No less than 85 per cent of all the rubber footwear made or worn in the United States is produced in the three states of Massachusetts, Rhode Island and Connecticut, and 50 per cent comes from Massachusetts alone. About half of the rubber footwear manufactured is the product of female labor.

The six principal companies manufacturing rubber footwear in Massachusetts are the Hood Rubber Co., Watertown, employing 9,100 persons for the manufacture of both footwear and tires; the American Rubber Co., Cambridge, employing 3,200 persons; the Boston Rubber Shoe Co., Malden and Melrose, employing 3,000 persons; the Converse Rubber Shoe Co., Malden, employing 1,700 persons for the manufacture of both footwear and tires; the Apsley Rubber Co., Hudson, and the Woonsocket Rubber Co., Millville. Of these the American Rubber Co., the Boston Rubber Shoe Co. and the Woonsocket Rubber Co. and subsidiaries of the United States Rubber Co., which has 50 factories of one sort or another, of which 17 in various states are largely devoted to the manufacture of footwear.

The largest single rubber footwear factory in the world, however, is that of the Hood Rubber Co., which has an average capacity of 65,000 pairs daily and has run a ticket as high as 72,000 pairs, and makes 20 per cent of all the rubber footwear produced in the United States. The Malden and Melrose plants of the Boston Rubber Shoe Co. also have a daily capacity in excess of 60,000 pairs. The Apsley Rubber Co. has one of the most completely equipped rubber footwear plants in the country, with a capacity of 20,000 pairs daily.

The 12,000 employes at the West Lynn plant of the General Electric Co. are being insured at the company's expense. Each man or woman in the company's employ one year will be insured for $500; two years, $750; three years, $1,000; four years, $1,250, and five years or more $1,500. Should an employe leave the company's service the insurance ceases, but may be continued through payments by the individual insured.

A 100 per cent American plant by September, 1920, is the goal which the Boston Woven Hose & Rubber Co., Cambridge, has set for itself. Very few aliens have been hired during December, and the policy of giving preference to American citizens is bringing satisfactory results. It may take a little longer to fill the job, but the job stays filled longer.

Twice a week, during the noon hour, an Americanization class is held in the recreation room of the plant for the benefit of

foreign-born employes, and the firm is pleased to render every assistance possible to such aliens in taking out citizenship papers. A class of twenty-five men has been enrolled and additional classes will be formed as soon as teachers can be secured.

Guy D. Niles, formerly manager for The Portage Tire & Rubber Co., is now in charge of the New England branch of the Gillette Tire Co., with offices and salesrooms at 587 Boylston street, Boston. Mr, Niles has grown up in the business of merchandising automobile tires and has a wide acquaintance throughout New England.

On December 9, the officers and plant managers of Everlastik, Inc., 52 Chauncey street, Boston, held a get-together meeting at the Boston City Club during which many ideas for the improvement of working conditions in the several mills were discussed. Those present were B. T. Martin, president; John Page, treasurer; W. B. Spencer, general manager; Charles Stretch, sales manager; Walter Martin, H. J. Martin, L. B. Chisholm, Arch. Martin, Alfred Martin, Sol. Kendrick, Henry Turner, Walter Dalby, Samuel Lounds, F. Gramelsback, A. S. Howard, Samuel Kendrick, W. Painter, Thomas Dreier, Wilwyn Herbert and Charles Lake.

Samuel K. Nason, director of vocational education in Brookline, a suburb of Boston, announces evening classes in automobile instruction, free to residents of Brookline, which will place students in a position to qualify for a chauffeur's license from the state. The care and repair of tires form part of the course, which is to be conducted by Robert V. Dallison, instructor for the Coast Artillery Motor Corps and the Y. M. C. A. Automobile School.

In order to provide additional capital to meet the increased demand for George Grow cord and fabric tires, the George Grow Tire Co., 323 Columbus avenue, is offering to the public 50,000 shares of non-assessable common stock at par, $10 per share. The factory at Canton Junction is producing 600 tires weekly, and as this output is consistently oversold the capacity will be increased to 6,000 tires weekly. The firm's product is marketed through a chain of stores operating in many leading New England cities.

L. J. Mutty, of the L. J. Mutty Co., manufacturer of automobile top fabric, Boston, has left for a sojourn of several months on the Pacific Coast, taking his motor car and golf sticks with him. W. N. Shelton, general manager of the company, reports that the demand for "Dridek" on the part of leading automobile manufacturers has quadrupled and that the export business is far above normal.

The Worco Tire Co., Worcester, also distributer for the Paige automobile, has been purchased by the R. C. Cann Co., of Boston. In the spring the new concern will build a large garage and service station near the present salesrooms.

NEW AJAX PLANT AT SANDUSKY, OHIO.

Horace DeLisser, president of the Ajax Rubber Co., Inc., New York City, recently announced that a new Ajax factory will be erected in Sandusky, Ohio, where ninety acres of land have been secured. The erection of the new plant will begin at once and by the latter part of 1920, tire production will be well under way. This is the third factory for Ajax, the others being in Trenton, New Jersey, and Racine, Wisconsin.

A housing plan for employes is being developed along with other welfare activities. Between 1,000 and 1,500 homes for Ajax workmen will be erected in Sandusky. Details for this housing plan which will be along lines similar to the housing project already under way at Racine, are now being worked out by the Ajax Industrial Welfare Department.

Discussing the plans for the new Ajax plant, Mr. DeLisser expressed his keen appreciation of the cooperation of the Sandusky Chamber of Commerce, which organization played an important part in making the project a reality.

MANAGER OF THE MALAY RUBBER CO.

OWEN MOYNIHAN, for the past two years general sales manager of the Amazon Rubber Co., Akron, Ohio, has resigned to assume active management of The Malay Rubber Co., which is being organized by distributers and dealers in all parts of the country for the purpose of manufacturing and merchandising a high-grade tire in a new plant to be built at Cleveland, Ohio.

OWEN MOYNIHAN.

Before his Amazon connections, Mr. Moyniham was eastern district representative of two Akron rubber companies, and previous to that time was in the offices of distributers. His broad understanding of tire distribution eminently fits him for his new position. In The Malay Rubber Co. will be associated with him tire experts to care for every phase of manufacture, production, sales and advertising.

CHAIRMAN OF GOODYEAR'S BOARD OF CONTROL.

W. D. SHILTS, assistant secretary of The Goodyear Tire & Rubber Co., Akron, Ohio, and chairman of the board of control, was graduated from Mt. Union College and began the study of law in Cleveland. Finding that it would be necessary to get work to pay his way while studying in 1904, he answered in person an advertisement for a stenographer placed by C. W. Seiberling in a Cleveland paper. Arriving in Akron, he was immediately engaged as the personal secretary of the then manager of the automobile tire department, at a time when the Goodyear output was 25 tires a day.

W. D. SHILTS.

Close application and a comprehensive grasp of details brought him promotion after four months. He was placed in charge of the correspondence of the tire department, and at the end of two years a realization of his opportunities with the Goodyear organization led him to abandon the thought of a career at the bar.

From that time his rise was rapid. He was soon made assistant to G. M. Stadelman and chosen as head of the automobile tire department, then selected as manager of the salesmen's department. His broad vision, coupled with exceptional executive ability, quickly brought further recognition, and he was made chairman of the board of control. Recently he was made assistant secretary, and so became one of the officials fourteen years after joining the company at the bottom of the ladder. Mr. Shilts will continue to act as chairman of the board of control.

THE RUBBER TRADE IN OHIO.

By Our Regular Correspondent.

MORE THAN 200 MEMBERS of the Detroit and Cleveland sections of the Society of Automotive Engineers held a two-day session at Akron, Ohio, December 1 and 2, as the guests of The Goodyear Tire & Rubber Co. The meeting was held for the purpose of presenting technical information pertaining to the application of pneumatic tires to motor trucks. The visitors witnessed a demonstration of a new development in truck design, the tandem axle construction—Goodyear's contribution to the truck industry.

Monday evening the engineers were guests at a banquet at which F. A. Seiberling, president of the company, and P. W. Litchfield, factory manager, made far-sighted predictions as to the future of the motor truck industry. Mr. Seiberling declared that within three years the solid tire would be obsolete and that the fabric tire would soon be supplanted by the pneumatic cord tire. Mr. Litchfield stated that the trolley car must go as a means of transportation—to be succeeded by the motor bus.

The visitors were taken on tours of the Goodyear factory, saw many interesting exhibits and enjoyed athletic sports in the company gymnasium. Four of them, selected by lottery from the 200 delegates, made a balloon flight with Ralph H. Upson, the Goodyear aeronautical engineer.

The Goodyear committee in charge was composed of C. R. Johnson, C. M. McCreery, J. E. Hall, W. S. Wolfe and E. R. Preston.

AKRON NOTES.

The Miller Rubber Co., Akron, has followed the example of the Firestone Tire & Rubber Co. in establishing a cooperative store for its employes. At present the store is handling only a comparatively small line of merchandise, but the plans of the company include its expansion until all commodities usually sold in a general store are included. A. R. Kiester is manager of the store.

The General Tire & Rubber Co., Akron, is completing the second addition to its plant made during the past six months. The addition is 120 feet long and 60 feet wide. Officials of the company estimate that their business this year will be considerably over $5,000,000.

The B. F. Goodrich Co. has erected garages near its plant where more than 500 employes can house their automobiles while they are at work.

George W. Sherman, for eighteen years connected with the reclamation department of The B. F. Goodrich Co., has resigned and will leave the employ of the company the first of the coming year. During the past few years he has developed the Akron Salvage Co., a company formed to save waste unreclaimable through the ordinary channels, to such an extent that he will devote practically all his time to this work.

A machine gun company belonging to the Ohio National guard has been organized by employes of The B. F. Goodrich Co.

The B. F. Goodrich Co. recently announced that at the end of the year all the salaried employes of the company would receive bonuses of 25 per cent of their salary. More than 6,000 employes will thus receive bonuses totalling $2,000,000. Wage advances have been made during the course of the year so that no general bonus for the employes in the factory is anticipated.

At present more than 2,300 persons of foreign birth are taking the Americanization courses in the schools conducted in the rubber factories and the public schools under the direction of E. C. Vermillion, formerly connected with the Firestone Tire & Rubber Co. There are 128 classes served by 105 specially trained teachers.

The Summit Mold & Machine Co., Akron, will build a machine shop in the near future.

Work has begun on a warehouse for crude rubber and manufactured products and a new machine shop for the Firestone Tire & Rubber Co. in connection with buildings 32 and 33. The new buildings will cost approximately $185,000 and the company hopes to have them ready by the first of the year.

The Portage Rubber Co. has broken ground for its new $200,000 factory building, the first unit of an entirely new plant. The building is to be 80 by 200 feet, three stories high, and is to be built with provisions for the addition of two more stories as soon as business warrants. At a recent meeting of the stockholders the announcement was made that business had increased 25 per cent since the signing of the armistice.

Ground has been broken for the first unit of the Doyle Tire & Rubber Co.'s plant on a 50-acre site recently purchased in Akron.

The new concern was recently organized with a capitalization of $300,000 by members of the family of Judge D. A. Doyle. The first factory building will be 54 by 110 feet.

The Phoenix Rubber Co. has received from the city building department, of Akron, a permit to erect a three-story brick building as an addition to its present plant. The addition will cost approximately $60,000 and will be 60 by 120 feet.

The Miller Rubber Co., Akron, has announced plans to build a $1,750,000 power plant and other factory extensions near Kenmore, which is in the greater Akron territory.

The American Rubber & Tire Co., Akron, has arranged to call in $350,000 worth of 7 per cent preferred stock outstanding before recapitalizing next spring for $2,000,000. The stock is being called in at 107.

The strike of the bituminous coal miners did not materially affect the rubber factories of Akron or vicinity because each of the companies had sufficient coal to last at least 30 days when the strike was declared. Business was hampered somewhat, however, by an embargo placed on incoming freight due to congestion in the local yards, making it difficult to get shipments of materials.

During the first part of December the Goodyear Tire & Rubber Co. was granted permits for additions to its factory to cost approximately $1,500,000.

The largest single shipment of crude rubber ever received in Akron was consigned to The Goodyear Tire & Rubber Co. in December, and amounted to 3,000,000 pounds, valued at $1,500,000.

The business of The Goodyear Tire & Rubber Co. during the past year amounted to approximately $250,000,000, it was announced at the annual meeting of the directors and stockholders.

F. A. Seiberling, president of the company told the stockholders that in his opinion the business of the company would be twice that amount for the year 1920. Profits of the company amounted to $23,277,245.29. During the preceeding year the sales of the company totaled $131,247,382.45 and the profits $15,388,190.

At the meeting of the directors the same officers who have served during the past year were reelected, except that W. E. Palmer was elected secretary besides being reelected treasurer. W. D. Shilts was elected assistant secretary.

Announcement has been made that The Goodyear Tire & Rubber Co., Akron, will soon erect a $200,000 dormitory for women near the plant. The building will house 175 women, it is estimated.

William O'Neill, a member of the welfare department of The Goodyear Tire & Rubber Co., and William Kroeger, manager of the Coventry Land & Improvement Co., a subsidiary company of the Firestone Tire & Rubber Co., have been elected members of the Akron city council.

The commercial representatives of England, France, Italy and Belguim, who visited the United States and attended the world trade convention held at Atlantic City, spent November 15 inspecting the rubber plants of Akron and were entertained at the Portage Country Club in the evening.

The Chamber of Commerce has prepared statistics concerning the business of Akron which indicate that during the past year the output of local industries amounted to $522,436,020, and the pay-roll of the city to $117,974,890, and the capitalization to $272,853,770. The production of the city at present is estimated at approximately 200,000.

The employes of the Akron rubber factories contributed the major portion of the $1,500,000 placed in the peace chest which has been organized to finance thirty-three welfare organizations of the city.

SOUTHERN DELEGATION OF AUTOMOBILE DEALERS AT AKRON.

Early in December a delegation of forty Chandler and Cleveland automobile dealers from Oklahoma, New Mexico, Panhandle Texas and Arkansas was entertained by The B. F. Goodrich Co., and the manufacture of tires demonstrated from start to finish. The trip was conducted by the Markham Motor Co., Oklahoma City, Oklahoma, the party traveling in a special Pullman coach. Automobile, tire and accessory factories were also visited in St. Louis, Indianapolis, Cleveland, Detroit and Chicago. The dealers returned to their respective territories fired by the optimism of the great automobile centers and better equipped to demonstrate cars and talk tires convincingly and profitably.

At the recent annual meeting of the stockholders of the Williams Foundry & Machine Co., Akron, Ohio, the following officers were elected: F. E. Halcomb, president; S. F. Ziliox, vice-president; G. Carl Dietz, treasurer; William J. Slater, secretary and assistant treasurer; Charles Reymann, Charles Herberich and A. W. Burnett, additional directors.

The company's plant is working to capacity on vulcanizers and miscellaneous machinery for the building and repair of tires. The demand for repair equipment is especially good at this time.

M. M. Whorley has been appointed assistant sales manager of The Mason Tire & Rubber Co., Kent, Ohio.

The Columbia Tire & Rubber Co., Columbiana, Ohio, will build a new plant in Mansfield, to be known as Plant No. 1. Stock to the extent of $500,000 has been issued and disposed of to provide funds for the purpose. The company's general offices will be removed to the new building as soon as completed.

The Henderson Tire & Rubber Co., Inc., Bucyrus, Ohio, is moving to its new plant on West Goodale street, Columbus, where it expects to produce about 1,500 tires daily. C. O. Henderson is president and treasurer Joseph Friedman, vice-president; and George C. Riley, secretary.

The Ultimate Tire & Rubber Co., Cleveland, Ohio, has bought a site of 12.6 acres of land at Collamer and East 152d street, touching the main line of the Nickel Plate railroad, where it will build its plant.

Ground has also been broken and construction begun on the buildings for the Excel Rubber Co., at Wadsworth, near Akron. The company recently organized with a capitalization of $600,000 of which only $100,000 is to be sold at this time, and that sale restricted to the citizens of Wadsworth.

R. C. Holman has been placed in charge of all blowing engines of the Hooven, Owens, Rentschler Co., Hamilton, Ohio.

The McLean Tire & Rubber Co., East Liverpool, Ohio, is completing a factory addition, 100 by 150 feet, two stories in height, of brick and steel construction, into which it expects to move about February 1, when production will be increased to average 1,000 tires daily. On December 1 the company began the manufacture of McLean cord casings, which completes its line of tires and tubes.

The Knox Tire & Rubber Co., Mt. Vernon, Ohio, will build a three-story factory building, 100 by 225 feet, to cost about $170,000.

The Ashland Tire & Rubber Co., Ashland, Ohio, will build a new tire plant.

MID-WESTERN NOTES.

By a Special Correspondent.

THE GENERAL ELECTRIC CO., Schenectady, New York, will build a new factory at Decatur, Indiana, 260 by 360 feet, for which site was recently purchased.

The Sewell Cushion Wheel Co., Detroit, Michigan, has bought 10½ acres of land at the corner of Harper avenue and the Detroit Terminal Railway, where it will immediately erect dry kilns and warehouses. Manufacturing for the present will continue at the company's building at Gratiot and Beaufait avenues.

The Michelin Tire Co., Milltown, New Jersey, has opened factory branches at 514 Mulberry street, Des Moines, Iowa, and at 26 West Woodbridge street, Detroit, Mich., both to be under the supervision of R. B. Tracy, district manager. The State of Iowa, eastern Michigan and northwestern Ohio territory will be covered.

A. Plamondon Manufacturing Co., 12-24 North Clinton street, Chicago, Illinois, is building a one-story machine shop and foundry on its property at 53d street and Western avenue, to cost aproximately $400,000. This company manufactures gearing and friction clutches as well as special machinery for the rubber trade.

The Gillette Rubber Co., Eau Claire, Wisconsin, which bought the business of the Chippewa Rubber Co., of the same city, some months ago, is continuing to manufacture the same products, namely, waterproof material for raincoats.

In order to take care of the increasing demand for its malleable iron chains for elevating, conveying and power transmission purposes, the Link-Belt Co., Chicago, Illinois, is completing its Belmont foundry at Indianapolis, Indiana, as originally laid out. The new building will be about 400 by 70 feet, and the necessary rolling mills, sand blast and other equipment will be installed as soon as possible, also a furnace of 15 tons capacity.

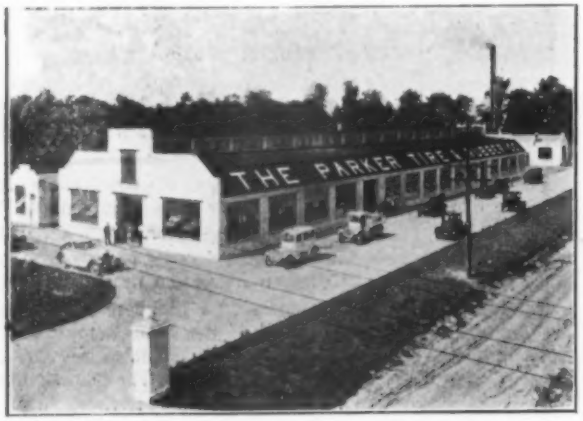
The Montana Cord Tire Co., Inc., 409 Central avenue, Great Falls, Montana, manufacturer of Montana cord and fabric tires, was incorporated in that state on May 28, 1919, with a capitalization of $500,000. It also intends to manufacture inner tubes and rubber sundries. The officers are: Clarence J. Drope, vice-president; J. R. Swan, secretary and treasurer. The office of president is vacant at present. The concern has bought a building 175 by 60 feet, near the Missouri river and two transcontinental railroad lines, and expects to place its tires on the market about May 1, 1920. The Montana tire is of heavy construction, having three layers of cord laid diagonally and individually insulated, with the intent to adapt it to the conditions of local roads. There is also a special patented attachment to the bead of this tire.

The International India Rubber Corp., South Bend, Indiana, has broken ground for a factory addition for the installation of three new mixing mills, one large-size calender, and three new vulcanizers, which it is expected will bring the capacity up to 800 tires and tubes daily.

The Goodyear Tire & Rubber Co., Akron, Ohio, has begun the construction of a new building at West 39th street and Winchester avenue, Chicago, to accommodate the Goodyear organization in that city. The building will have four stories and basement and be of reinforced concrete, containing 200,000 square feet of floor space. A private track and tunnel will be built for incoming freight, giving access to the central freight station and express receiving room.

THE PARKER TIRE & RUBBER CO.

A distinctive feature of the new factory of the Parker Tire & Rubber Co. at Indianapolis, Indiana, is that it is all white, including the driveways, entrance posts and all the inside wood-



PLANT OF THE PARKER TIRE & RUBBER CO.

work. This is in accordance with the company's advertising scheme which starts with a white strip on the tires it manufactures and is continued in the pure white trucks and service and pleasure cars.

The Parker company claims to be the only one in the country specializing absolutely in cord tires; it makes no tubes or rubber goods of any kind, no plain tread, rib tread or fabric tires. It manufactures only the one non-skid design, which it calls a combination non-skid and rib tread. The capacity of the factory is 500 cord tires a day. The tires are almost as large as the next standard oversize and are therefore called super-size cord tires. The company's plan is to extend its business, especially in the south, having already been successful throughout the southwest territory.

ACCESSORY FIRM TO MAKE TIRES.

The A. J. Stevens Rubber Co., Kansas City, Missouri, manufacturer of tire accessories and fabric products, has entered the tire manufacturing field with the Stephens White Tread Tire, guaranteed for 6,000 miles. Inner tubes are also being produced. The present capacity of the plant is 300 casings a day, and this will be increased as new machinery is installed.

The company began in 1916 with six employes, and has outgrown two plants. Its production of blowout patches has reached 3,000,000 annually, and of fan belts 2,000,000. The capital stock was recently increased to $1,500,000, and the expansion into tire and tube making will increase the number of employes to 500 or 600.

PACIFIC COAST NOTES.

By Our Regular Correspondent.

LOS ANGELES NOTES.

C. E. HENSON, secretary to vice-president and general manager A. F. Osterloh, of the Goodyear Tire & Rubber Co., of California, has arrived in Los Angeles and assumed charge of the local office. Mr. Henson, who is a native of Ohio, is well acquainted with California, having spent five years in this state, during which he served as secretary to the treasurer and the board of trustees of Leland Stanford Junior University, secretary to the vice-president of the Panama-Pacific Exposition, and was also in the Goodyear office in San Francisco.

J. J. Rafferty, director of the Philippine Bureau of Commerce and Industry, was a recent visitor in Los Angeles, making the rounds of business houses to urge the importance of recognizing Manila as the American shipping base of the Orient. Mr. Rafferty pointed out that the Philippines are now exporting to the United States more than a dozen commodities, not the least of which is rubber, of which there are over 2,000 acres under cultivation in the isiands.

Henry Joseph, field sales manager of the Re Miler Rubber Co., Ashland, Ohio, has closed a deal in Los Angeles by which the Western Auto Supply Agency will handle exclusively the "Re Miler," a complete interliner.

Fifteen carloads of Osler-Racine tires recently arrived in Los Angeles to supply the demand for this particular make of tires in Southern California.

Considerable discussion has arisen lately in southern California over the inflation scale adopted by the Tire and Rim Division of the Society of Automotive Engineers. The western theory seems to be that no standard inflation scale will fit all conditions—that the load carried in the rear is most important in determining the amount of air pressure, and that the road conditions alter every standard rule. H. O. Alexander, special representative of The Miller Rubber Co., Akron, Ohio, with headquarters in San Francisco, says: "According to the S. A. E. scale, a five-inch cord tire should carry a pressure of 80 pounds. Undoubtedly that may be true from the standpoint of an average pressure for maximum riding comfort, but on the splendid roads of California those figures are by no means conducive of maximum mileage. The S. A. E. scale is not definitely applicable in all cases for the simple reason that every tire should be inflated strictly according to the work it is doing."

S. S. Abrams, of Los Angeles, general manager of the Superior Tires Corporation, has secured the local distributing agency for Mohawk tires.

Howard Reed, of Los Angeles, is successor to the retail business of the Wade Tire & Rubber Co., distributers for the Canton cord and the Knight & Blackstone fabric tires on the Pacific Coast.

J. V. Mowe, assistant general sales manager of the Kelly-Springfield Tire Co., New York City, was a recent visitor in

Los Angeles during the progress of a tour of inspection in all the western territory.

Los Angeles city officials are just now wrestling with the problem of completing Municipal Power Plant No. 2 in the San Francisquito canyon by May 1, so that it will be ready to supply power to the $12,000,000 Goodyear Tire & Rubber Co.'s plant. More money is required at once, some $750,000 being needed to meet outstanding contracts on Plant No. 2 and at the Owens river gorge.

F. A. Seiberling, president of The Goodyear Tire & Rubber Co., recently arrived in Los Angeles to inspect the progress on the company's new plant. He is confident it will be completed by July 1, and declares that fully 15 per cent of the company's total output will come from the local factory. Mr. Seiberling states that other eastern tire manufacturers are preparing to locate plants here and that automobile manufacturers will follow.

Speaking of cotton prospects, Mr. Seiberling said that the development of the Salt river district has been something marvellous, the acreage having been expanded until this year there are more than 90,000 acres planted. Growers are predicting the best crop in the history of the valley. Floods have done some damage, but this will not amount to more than 15 per cent of the entire crop. The Goodyear company has bought two-thirds of the Salt river crop and would have purchased it all had that been possible.

Work on the installation of the fire-fighting facilities in the city's new cotton compress building at Los Angeles harbor has been completed and work on the first orders of cotton has already been started. Orders for the compressing of 3,000 bales were received during December, while dozens of inquiries were received from Imperial Valley planters. The cotton compress has a maximum capacity for 24 hours of 2,500 bales, or about 1,000 bales for an eight-hour day.

Word received in Los Angeles indicates a rapid increase in the rubber and tire vulcanizing business in Honolulu. The great influx of tourists has taxed the automobile capacity of the Hawaiian Islands to its utmost capacity. The Honolulu Rubber Works has been forced to enlarge its salesrooms and vulcanizing department. A thoroughly up-to-date tire repair department will be established.

A novel use for rubber tires was recently discovered at Long Beach, the largest city in close proximity to Los Angeles. The suspicions of the police were aroused by the frequent visits to a bicycle store, and a detective paid a visit to it.

"A little puncture," he remarked to the proprietor.

"Whata you lika, wiska or branda?" was the enigmatic reply. The detective said he was taken to the back of the shop where two tires, one full of brandy and the other of whiskey, dangled from a rack. By placing his mouth over the valve stem a most exhilarating puncture preparation could be obtained at 50 cents a swallow. The detective seized a small still operated in connection with the tire establishment.

Bruno J. Becker, general manager of the Gale Henry Comedy Co., of Los Angeles, has an invention which he hopes may serve to prevent tire thefts from which he has suffered recently. Locks on the tires proved to be of little avail, so he has concealed underneath his car a bell, which will start ringing immediately the tire is removed from the rack in the rear and continue until the battery has run down.

R. C. Schlesinger, sales manager of the Keystone Tire & Rubber Co., New York City, is in Los Angeles to spend the winter. He has seen the organization grow from one store to its present chain of 180. He will visit all the Keystone stores in the West during his visit.

J. E. Argus, of San Francisco, who has been district manager of the Goodyear Tire & Rubber Co., has been transferred to Los Angeles to become manager of the mechanical goods department. Mr. Argus joined the force in San Francisco on July 15, 1913, and became manager of the mechanical goods department on November 15, 1915. Frank E. Carroll was appointed to succeed Mr. Argus in San Francisco. Mr. Carroll has been in the employ of the company for 12 years, having entered its service on April 10, 1907. He is president of the Downtown Association and a member of the Olympic Club.

SAN FRANCISCO NOTES.

The United States Rubber Co., San Francisco, will shortly occupy larger quarters at Second and Folsom streets, where all business of the branch will be conducted.

Sam J. Turnis, general sales manager of the tire division of the Brunswick-Balke-Collender Co., New York City, has perfected plans for an active sales campaign in northern California. The Frank A. Busse Sales Co. has been appointed Brunswick tire dealer in San Francisco, Oakland, Alameda and Berkeley. San Francisco is to be the headquarters of the company in the Far West.

H. Senn, head of the tire department of Chanslor & Lyon Co., San Francisco, distributer of Lee tires, has just returned from a distributers' conference held in the Lee factory at Conshohokon, Pennsylvania, where sixty were in attendance.

The Ideal Tire & Rubber Co., Cleveland, Ohio, plans to complete its representation on the Pacific coast. A. S. Davies, treasurer, and D. C. Hathaway, general sales manager, were recent visitors in San Francisco for the purpose of appointing a northern California distributor for the Greyhound line. They visited their distributers in Spokane, Portland and Seattle.

Roy R. Meads, president of the Pacific Rubber Co., of Los Angeles, has opened a new salesroom for the company at 950 Mission street, San Francisco. P. H. Stortz, former sales manager, is in charge. The company is distributer of the Horseshoe pneumatic tires on the Pacific Coast.

The Power Rubber Co., of San Francisco, distributer of Racine tires, entertained its dealers, agents and branch managers recently. The men came from the entire territory, including Del Norte County in the north and Bakersfield in the south. After a series of business talks they were guests of the company at Tait's at the beach. Over 100 covers were spread. Horace de Lisser, president; R. Y. Cooke, general sales manager, and Robert B. Crane, manager of the material and sundries department, were present at the gathering.

MISCELLANEOUS WESTERN NOTES.

L. B. Broering, factory representative of The Mason Tire & Rubber Co., Kent, Ohio, was recently in Sacramento in connection with a large warehouse which his company is preparing to establish on the Pacific Coast.

George Bellis, recently Los Angeles branch manager of the Goodyear Tire & Rubber Co., has been promoted to the position of district manager of the northwestern district, with headquarters at Portland, Oregon. Mr. Bellis started his career with the Goodyear company as mechanical goods salesman on July 27, 1913, covering Nevada and northern California, and since that time has been one of the prominent factors in the rapid growth of the Goodyear Pacific Coast business. In December, 1914, he was appointed branch manager at Sacramento, and was there until June, 1917, when he was ordered south to take charge of the Los Angeles branch. Since Mr. Bellis has been located in Los Angeles he has taken an active part in public affairs and has become very well known to the tire trade.

THE RUBBER COMMITTEE OF THE JAMAICA AGRICULTURAL SOCIETY has reported that the planting of *Castilloa* is not profitable, and that it is not advisable to continue planting the trees for shade on the cacao plantations, save in certain cases.

The Mid-West Rubber Manufacturers Association.

First Annual Meeting and Banquet.

FIRST ANNUAL BANQUET OF THE MID-WEST RUBBER MANUFACTURERS ASSOCIATION, HELD AT THE CHICAGO ATHLETIC CLUB, CHICAGO, ILLINOIS, DECEMBER 6, 1919.

THE FIRST ANNUAL MEETING AND BANQUET of the Mid-West Rubber Manufacturers Association took place at the Chicago Athletic Club on Tuesday evening, December 9. The business meeting was held at 2 P. M. on the same day and was well attended by members of the Association and their guests. After the customary routine which included reading of the minutes, treasurer's report, etc., the chairman, John W. Maguire, president of the Association, called upon several of the members for remarks relating to the various industries which they represented.

Thomas M. Gardner of the Brighton Mills spoke on the tire fabric situation and incidentally said that every indication pointed to a shortage of cord material, and advised that in the premises it might be well for manufacturers to figure on providing for other types on the ground that if an adequate supply of cord tires could not be turned out, pneumatics of some other character would naturally be substituted. He particularly inveighed against the use of low-grade cord because of its effect on the finished product.

Charles T. Wilson of Charles T. Wilson Co., Inc., said that it was his opinion there would be at least a sufficient supply of crude rubber to correspond with the amount of fabric available.

Wesley E. Wilson of the Akron Rubber Mold & Machine Co. spoke informingly on the subject of rubber molds.

The next speaker, A. G. Hanauer, president of the Washington Tire & Rubber Co., gave an attractive description of the Northwest generally and Spokane specifically as a most available location for rubber manufacturing concerns. He said that manufacturing conditions were ideal, including labor, which was one hundred per cent American.

Ohio as a rubber manufacturing center was defended by W. C. Owen of the Owen Tire & Rubber Co., who claimed that because of shipping facilities and proximity of supplies there was no superior location. W. W. Wuechter of the Nebraska Tire & Rubber Co., manifested a high regard for Omaha as a rubber manufacturing point.

The secretary read a paper on Industrial Relations from the Rubber Club of America, suggesting the cooperation of the Mid-West Association in that the combined organizations might act as a unit in facilitating relations between employer and employe.

The following nominating committee was appointed by Mr. Maguire: Clark H. Bennett, Featheredge Rubber Co., M. S. Ackles, Lincoln Highway Tire Co., F. I. Chichester, Twin Tube & Rubber Co., J. F. Benner, Electric Rubber Reclaiming Co., J. B. Gabeline, Standard Four Tire Co., and the following directors were elected:

John W. Maguire, Portage Rubber Co., John T. Christy, Hawkeye Tire & Rubber Co., C. H. Wright, Racine Auto Tire Co., George B. Dryden, Dryden Rubber Co., F. I. Chichester, Twin Tube & Rubber Co., D. M. Mason, The Mason Tire & Rubber Co. and W. W. Wuechter, Nebraska Tire & Rubber Co.

The dinner, which commenced at seven o'clock in the banquet hall of the Chicago Athletic Club was one of the happiest func-

tions of its kind. The general arrangements, including the menu, music and cabaret, were all of noteworthy class that reflected with credit the management of John W. Maguire who also officiated most acceptably as toastmaster.

The principal speaker of the evening was John Fletcher of the Fort Dearborn National Bank of Chicago, who dealt exhaustively with financial, industrial and agricultural conditions of the West. He delivered a most informing speech, which was enthusiastically applauded. The other speakers were Theodore Eugene Smith of the "India Rubber Review," who spoke in his usual happy and instructive vein which carried a strong appeal to all those present. E. F. Pfaff of THE INDIA RUBBER WORLD referred in a congratulatory manner to the marked progress of the association and the very genial character of the meeting and dinner.

Both the meeting and the banquet demonstrated that, while the Association is still in the yearling class, it is in every other respect well grown and amply constituted to rank with the best organzations of its kind. Following is a list of those attending the meeting and banquet:

MEMBERS AND GUESTS.

Ackles, M. S.	Lincoln Highway Tire Co.	Fulton, Ill.
Allen, S. D.	Racine Auto Tire Co.	Racine, Wis.
Barnes, J. P.	Cupples Company	St. Louis, Mo.
Barton, Walter C.	Dryden Rubber Co.	Chicago, Ill.
Benner, J. S.	Electric Rubber Reclaiming Co.	Barberton, Ohio.
Bennet, Clark H.	Featheredge Rubber Co.	Chicago, Ill.
Bostwick, S. E.	Gillette Rubber Co.	Eau Claire, Wis.
Brodhead, Garret, Jr.	Central Rubber Co.	Defiance, Ohio.
Buchter, O. G.	Newsom Valve Co.	St. Louis, Mo.
Castor, C. A.	Lion Tire & Rubber Corp.	Lafayette, Ind.
Chichester, F. I.	Twin Tube & Rubber Co.	Chicago, Ill.
Conners, A. V.	Horse Shoe Rubber Co.	Chicago, Ill.
Davis, A. F.	Ideal Tire & Rubber Co.	Cleveland, Ohio.
Davis, I. R.	Ideal Tire & Rubber Co.	Cleveland, Ohio.
Drake, R. E.		Indianapolis, Ind.
Dunbar, Frank J.	J. Frank Dunbar Co., Inc.	New York, N. Y.
Eyer, F. R.	Standard Four Tire Co.	Keokuk, Ia.
Fletcher, J.	Fort Dearborn National Bank.	Chicago, Ill.
Follen, P. E.	Lion Tire & Rubber Corp.	Lafayette, Ind.
Follen, Thos.	Lion Tire & Rubber Corp.	Lafayette, Ind.
Freshman, Chas.	H. Muehlstein & Co.	New York, N. Y.
Gabeline, J. B.	Standard Four Tire Co.	Keokuk, Ia.
Gardner, Thos. A.	Brighton Mills	Passaic, N. J.
Gereke, Edw. G.	Gereke-Allen Carton Co.	St. Louis, Mo.
Hanauer, A. G.	Washington Tire & Rubber Co.	Spokane, Wash.
Harrah, W. F.	National-Standard Co.	Niles, Mich.
Harris, S. W.	The Akron Rubber Mold & Machine Co.	Akron, Ohio.
Hayes, C. W.	Dykes Tire Machine Co.	Chicago, Ill.
Henderson, H. H.	F. R. Henderson & Co.	New York, N. Y.
Hern, Emil	Pierce Wrapping Machine Co.	Chicago, Ill.
Hoffman, Chas.	The Mansfield Tire & Rubber Co.	Mansfield, Ohio.
Horn, F. J.	Fred. Stern & Co.	New York, N. Y.
Jenkins, W. C.	"The New York Commercial"	New York, N. Y.
Kendall, J. A.	J. A. Kendall	Akron, Ohio.
Lahey, F. T.	Poel & Kelly	Akron, Ohio.
Le Pan, L. N.	C. T. Wilson Co., Inc.	New York, N. Y.
Maguire, J. W.	The Portage Rubber Co.	Akron, Ohio.
Matthias, J., Jr.	Mineral Point Zinc Co.	Chicago, Ill.
Meyer, E. T.	F. R. Henderson & Co.	New York, N. Y.
Mock, D. A.	Raw Products Co.	New York, N. Y.
Morgan, D. M.	C. J. Tagliabue Manufacturing Co.	Brooklyn, N. Y.
Muehlstein, Chas.	H. Muehlstein & Co.	New York, N. Y.
Oscars, E. B.	The Majestic Tire & Rubber Co.	Indianapolis, Ind.
Owen, W. C.	The Owen Tire & Rubber Co.	Bedford, Ohio.
Parker, Paul R.	Parker Tire & Rubber Co.	Indianapolis, Ind.
Parkin, W. H.	National-Standard Co.	Niles, Mich.
Pfaff, E. F.	"The India Rubber World"	New York, N. Y.
Pough, F. H.	Southern Acid & Sulphur Co.	St. Louis, Mo.
Puhlman, C. M.	J. H. Lane & Co.	New York, N. Y.
Ramsay, H. W.	Cupples Company	St. Louis, Mo.
Reeves, Geo. C.	Dryden Rubber Co.	Chicago, Ill.
Roberts, Preston E.	The Perfection Tire & Rubber Co.	Fort Madison, Ia.
Rutter, Frank S.	Chas. E. Wood	New York, N. Y.
Sawyer, Chas. F.	Sioux City Tire & Manufacturing Co.	New York, N. Y.
Smith, Theo. E.	"The India Rubber Review"	Akron, Ohio.
Smith, Mark L.	Stresen, Reuter & Hancock.	Chicago, Ill.
Stanley, J. Richard.	J. Frank Dunbar Co., Inc.	New York, N. Y.
Stenson, C. C.	Wilson Tire & Rubber Co.	Springfield, Ill.
Stepan, A. C.	The Roessler & Hasslacher Chemical Co.	New York, N. Y.
Stern, Alfred	H. Muehlstein & Co.	New York, N. Y.
Stilwell, W. H.	Eclat Rubber Co.	Cuyahoga Falls, Ohio.
Syfers, R. H.	The Majestic Tire & Rubber Co.	Indianapolis, Ind.
Taveniere, C.	Chas. E. Wood	New York, N. Y.
Todd, W. W.	Mid-West Rubber Manufacturers Association	Chicago, Ill.
Tompkins, A. G.	Sioux City Tire & Mfg. Co.	New York, N. Y.
Tumpyer, Julius	A. Daigger & Co.	Chicago, Ill.
Viles, A. L.	The Rubber Association of America	New York, N. Y.
Webber, Henry S.	Heyden Chemical Works.	St. Louis, Mo.
Wedgwood, Jos. V.	Portage Rubber Co.	Akron, Ohio.
White, W. W.	C. J. Tagliabue Manufacturing Co.	Brooklyn, N. Y.
Whittaker, Wm.	Chas. E. Wood	New York, N. Y.
Wilber, Marshall D.	Palmer Tire & Rubber Co.	St. Joseph, Mich.
Wilson, Chas. T.	Chas. T. Wilson Co., Inc.	New York, N. Y.
Wilson, E. W.	Wilson Tire & Rubber Co.	Springfield, Ill.
Wilson, W. E.	Akron Rubber Mold & Machine Co.	Akron, Ohio.
Wishnick, Robert	A. Daigger & Co.	Chicago, Ill.
Wright, Clarence.	Racine Auto Tire Co.	Racine, Wis.
Wrisberg, W. E.	Newsom Valve Co.	St. Louis, Mo.
Wuchter, W. W.	Nebraska Tire & Rubber Co.	Omaha, Neb.

CANADIAN NOTES.

The Mount Royal Rubber Co. opened its new factory building on Messier street, Montreal, Quebec, with an informal housewarming on the evening of December 5, 1919. About eight hundred guests attended, including officials, executives, and employes of the offices, factories and field organizations of Ames Holden McCready, Limited, The Ames Holden Tire Co., Limited, and Ames Holden Felt Co., Limited, as well as of the Mount Royal Company. Dancing followed an informal reception and refreshments were served at midnight on the third floor of the building.

The Goodyear Tire and Rubber Co. of Canada, Limited, according to report, will build a $75,000 plant in Regina, Saskatchewan, to serve as western headquarters in Canada.

The Brunswick-Balke Collender Co., Hanna avenue, Toronto, Ontario, is reported to have bought a factory site at Woodstock, the same province, where it will construct a new plant to cost $200,000.

The Imperial Tire Co. is the new name of what was formerly the Imperial Vulcanizing Co., 569 Yonge street, Toronto, Ontario, the change being in name only. This concern is Toronto distributer for the Gates half-sole tire.

Extensive plant increases are being made at the Sherbrooke, Quebec, factory of the Canadian-Connecticut Cotton Mills, Limited, manufacturers of Sea Island, Egyptian, peeler and Arizona cotton fabrics. New funds to the extent of $5,000,000 have been arranged for and it is understood that some very important and strong connections are identified with the enterprise. With the increased facilities to be in operation in 1920 the plant will have a capacity of 13,000,000 pounds or more of tire fabric. This is considered to be in excess of the consumption of the country, but it is the desire of the company to make ample provision for the future growth of the Dominion. Meanwhile the surplus product will be exported, active preparations for this latter branch of the business already being under way. Provision has also been made for another large extension in 1921.

The offices of the company are at 15 Park Row, New York City, and the officers are: Harry L. Burrage, president; Tracy S. Lewis, treasurer; R. J. Caldwell, chairman; and Obadiah Butler, secretary-treasurer.

CHICLE CONCESSIONS IN CENTRAL AMERICA HAVE LONG BEEN exploited by chewing gum manufacturers. Now comes the acquiring of balata concessions in Venezuela by the English firm of R. & J. Dick, pioneers in gutta percha and balata manufactures. The next step to assure guttas for belting, golf balls, cables and chewing gum will doubtless be the growing of trees or shrubs capable of producing gum plastic somewhere in the Americas.

The Rubber Trade in Great Britain.

By Our Regular Correspondent.

SPREADING ROOM VENTILATION.

BENZOL POISONING, which was referred to recently in this correspondence, has now become of general interest to the proofing trade, not that benzol is likely to be commonly used, but because the Home Office Factory Department is considering whether the stringent rules as to ventilation are to be applicable and compulsory in all cases where solvent naphtha is used. If this comes to pass—and it seems quite likely—it means a good deal of trouble and expense in a matter which many proofers consider does not call for any alteration in procedure. What may be necessary where poisonous dope is used and where fatalities have occurred, is not wanted, they say, in ordinary rubber proofing, the workmen engaged in which can be shown by statistics to be healthy and long lived. Of course, the ventilation in a good many old and cramped spreading rooms might be improved with advantage, but a protest is being raised against the proposed compulsory adoption of the somewhat severe dope regulations.

The scheme is that air previously warmed is to enter the roof or ceiling of the spreading room and be drawn out by a fan near the floor, an arrangement which is intended to insure that the operatives are always breathing air free from naphtha-vapors. Some firms have already been put to considerable expense in arranging matters to meet the factory inspector's present requirements, and others who are enlarging or moving to new premises are in trepidation as to the alterations they may be compelled to make in the near future if greater stringency is decided upon by the powers that be.

It seems to me that the time is not ripe for any general condemnation of solvent naphtha, though there is certainly room for experimental work as to the effects of thorough ventilation upon the health of the workmen—experimental work such as has been carried out in the cases of benzol and dope. Solvent naphtha is not a war-time novelty sprung upon the trade, and the experience of those who have worked with it for half a century should not be lightly put aside by those in authority who have only recently made its acquaintance. It seems likely that one result of the new move will be an increased tendency to consider the representation of the naphtha recovery engineers who, generally speaking, have been preaching in the wilderness.

With regard to the possible future use of benzol in rubber works the matter of price will be an important factor. At present this is controlled by the Benzol Manufacturers Association which is selling a heavy benzol for motor use at about 2 shillings per gallon. This price, however, is now about to come up for consideration at the hands of the Central Profiteering Committee in London and it is possible that some reduction may be brought about.

THE GREENGATE AND IRWELL RUBBER CO., LIMITED.

This company has been formed with a nominal capital of £800,000 to acquire the two private limited companies of I. Frankenburg & Sons and the Irwell and Eastern Rubber Co., both of Salford, Manchester. Frankenburg's is the older company, its chief concern being with the proofing branch, though the manufacture of insulated wire and canvas shoes were added at later dates. The Irwell company, in which I. Frankenburg was also largely interested financially, was concerned solely with mechanical goods and the manufacture of balata belting. James Tinto has been the leading spirit in this company since its inception and now becomes chairman of the new company, the main reasons for the formation of which are the closing of various trusts held by the late Mr. Frankenburg and the desire to raise additional capital. The land, buildings, plant, etc., are valued at £240,000, independent of the stock in trade, book debts, investments, cash in bank, etc.

The new capital issue to the public is 250,000 7½ per cent preference shares of £1 each, and despite the flood of new issues at the time the prospectus was issued, the response seems to have been most satisfactory. Commentators in the financial columns of the press expressed the view that these shares were a good investment for all classes, being well secured both as to principal and interest. Among the directors of the new company are Sydney Frankenburg, who has been in active service for the duration of the war, and J. Gibson Tinto, son of the chairman.

FUSION OF RUBBER MANUFACTURERS AND GROWERS.

The Federated Rubber Growers & Manufacturers, Limited, is the title of a new company formed by the combination of Wood-Milne, Limited, of Leyland, George Spencer Moulton & Co., Limited, Bradford on Avon, and the Pundul Estates, Limited. The capital is £1,250,000 in ordinary shares of £1. The directors are Alexander Spencer, London, chairman; Frank Turner, Rochdale, vice-chairman; F. Spencer, Ashton Abbotts, Buckinghamshire, and H. B. Potts, Rochdale. The rubber estate showed a net profit of £4,000 for last year. A recent quotation for the shares of the new company was 27*s.* 6*d.*

STANDARD TYRE AND RUBBER MANUFACTURERS, LIMITED.

This company has been formed with a share capital of £200,000 to take over from the Chemical Engineering Corporation, Limited, as a going concern, the Alperton Rubber Mills near Wembley, Middlesex. The purchase consideration is £125,000, and in order to provide sufficient capital £60,000 debentures have been issued. The offer to the public was £100,000 ordinary shares of £1 each.

The works management is to be in the capable hands of Mr. Hughes, formerly with the Dunlop company and more recently with the Victor Tyre Company and the Almagam Works, of Harpenden. Mr. Warwick, of the latter company, who was also connected with the Wembley Works when they were controlled by the Chemical Engineering Corporation, Limited, has now no interest in the new company.

FIRES.

In November a fire occurred at the works of G. W. Laughton & Co., Limited, rubber manufacturers, of Craft street, Clayton, Manchester. Another fire of a more serious nature was at the Bank Bridge Works, Limited, near Manchester, the new plant which was due to start work in a week's time and which had cost £10,000 being very considerably affected.

TRADE NOTES.

The motor shows and the motorcycle and cycle shows in London in November seem to have been successful from all points of view, except for the difficulty experienced by visitors in securing hotel accommodation. It will be some time before this state of affairs rights itself, as we all hope it will some day, and for this reason, if for no other, it will come as a relief to many that H. G. Montgomery, upon whom the mantle of the late Staines Manders has fallen, has decided to postpone the next International Rubber Exhibition in London from 1920 to 1921.

The descent of London financiers upon Lancaster for the purpost of buying up cotton mills has naturally caused a great stir, and from the prices that have been paid to the fortunate hold-

ers of shares, it is clear that the cotton requirements of the rubber industry will not be filled at easier prices than now rule for some time to come.

At the time of writing—the end of November—a deadlock exists in the Industrial Council for the rubber trade regarding the demands by the operatives of a further increase in wages. The India Rubber Manufacturers Association has turned a deaf ear to the request, mainly because it does not represent the whole of the trade and is not inclined to agree to terms which would not be binding upon others. The assistance of the Ministry of Labor has been invoked and a conference is to be arranged. The workmen's union, it is said, is desirous that the matter should go to arbitration, but this does not appear to meet with the employers' views.

EUROPEAN NOTES.

THE RUBBER EXHIBITION that was to have been held in London next summer has been put off till 1921. An exhibition of rubber goods from French manufacturers that was planned for the end of November in the rooms of the French Chamber of Commerce in Queen Victoria street was also given up.

British capital set out 75 per cent of the rubber plantations, of which more than 50 per cent are on territory belonging to Great Britain. Of the estimated 300,000 tons of rubber that plantations will produce, 220,000 will be England's. Some figure on a rubber production of 500,000 tons in 1926.

Fear is expressed in some British circles that Americans will buy up their rubber shares on the Stock Exchange, as they have a 16 per cent advantage over English capital, owing to the fall in exchange.

The Research Association of British Rubber & Tyre Manufacturers may be addressed in care of W. B. Peat & Co., 11 Ironmonger Lane, London, England.

Exports of rubber from London to the United States in the first ten months of 1919 amounted to $20,822,018 worth; in the same period of 1918 the value of rubber exported was $3,743,639. In the month of October alone the value of rubber shipped was $6,958,479, compared with $4,119,028 in September.

Rubberized fabrics according to British reports are in demand greatly exceeding the supply. It is greatest from France, which is a center for continental trade in the goods, but Holland, Scandinavia and South America, which calls for ponchos, are trying to buy extensively in the British market, and China and Japan are coming in also, especially for light weight cloths and garments. The Australian demand has fallen off, but Canada can do with any amount of British stuff in spite of the competition from the United States.

The London Central Committee under the Profiteering Act has now been formed. Among the large number of names, representative of a variety of manufacturers is that of Alexander Johnstone, of the North British Rubber Co., Limited, representing rubber. He was nominated by the Federation of British Industries, both he and James Sands, of the Irwell & Eastern Rubber Co., Limited, being on the directorate of that Federation.

Hale & Son, brokers in crude rubber, balata, gutta percha and asbestos, 10 Fenchurch avenue, London, England, announce that William Bertie Jenner Horne has been taken into the partnership. Mr. Horne has been associated with this firm for the past fourteen years. The other partners are M. G. Hale, B. S. Ingram, J. M. Vanhouse and M. W. Palmer.

Finland's first factory for making balata belting, the *Finska Remfabrikan So.* (*Suomen Hilmatchdas, O. Y.*), founded in 1916, has been able to begin work only recently, as the balata, rubber and gutta percha it had bought in England was held up in Sweden during the war and has only just now been released.

The great Vickers plant at Barron in Furness has been converted to a peace basis and the projectile shop is now turning out machinery, including rubber mixers and calenders.

The plan of standardizing golf-balls is discouraged for the present by "The India-Rubber Journal" on account of the difficulty in changing molds.

Poland requires no import license for raw celluloid, rubber, caoutchouc, and technical manufactured rubber goods.

The union of German surgical hard and soft rubber manufacturers, at a meeting held in Leipzig to regulate prices, on account of the general rise, decided for an increase after November 14, 1919, of 10 per cent on seamless and patented rubber goods and of 25 per cent on hard rubber goods.

The German rubber industry shows a generally satisfactory activity and the manufacture of tires has started up again. Orders, however, can be filled only in part, owing to the deficiency in crude rubber and in coal.

German firms are taking large orders in Denmark for surgical and hygienic rubber goods, hard rubber combs, etc. Owing to the low value of the mark they can compete against English and American manufacturers, but whether they can deliver their goods seems doubtful.

At Fröndenberg on the Ruhr, a factory has been established for the manufacture of automobile tires and rubber goods for export to Russia by the proprietors of the late Prowodnik works at Riga, in connection with the cable works at Fröndenberg The company is called the *"Rhenish-Westfälische Gummi und Gutta Percha Werke, Atlantik,"* and plans to turn out 2,000 pneumatic tires a day. The Prowodnik works at Riga may be started again with machinery provided by British and French agency.

Italy's consumption of raw rubber increased four-fold in the eight years ended in 1918, when it imported 7,545 metric tons of crude rubber. Turin and Milan are the important centers for the rubber and allied industries, though there are factories also at Genoa, Leghorn and Naples. These employ about 20,000 workmen and produce every kind of rubber article; automobile, motorcycle and bicycle tires are the most important and the output of insulated wire and cables is very large. The Italian company that manufactures insulated wires is about to increase its capital. A recent Royal decree regarding telephone equipment gives the preference first to Italian goods, produced by Italian capital and labor and using native material, and next to foreign firms, established in Italy and producing their goods in that country. Where bids are called for native firms will have a protection of 10 per cent and foreign firms producing in Italy a protection of 5 per cent.

GERMAN RUBBER REGISTRATIONS END—TRADE FACES ECONOMIC DIFFICULTIES.

Special Correspondence.

BY A NOTICE dated September 20, and taking effect September 21, the German Imperial Minister for Industry has officially put an end to the confiscation of and obligation to register crude rubber, gutta percha, balata, reclaimed rubber, asbestos, partly or wholly finished manufactures, and also the prohibitions against producing them.

The German compulsory management of rubber is therefore ended. The Association for the Sale of War Tires will be dissolved at the end of the year. The prohibition of importation of automobile tires still stands on paper; nevertheless, adequate quantities are to be admitted free in so far as German industry cannot meet the demand. Really it ought to be able to meet it since even before the prohibition on production was lifted, both

secretly and more or less openly, large purchases of rubber were made. For that matter the crude rubber situation is merely a question of importation. Much more difficult is the procuring of the necessary textiles and, most serious of all, are the prospects of a coal shortage this winter. The outlook in this respect must be described as very unfavorable. The Continental Rubber & Gutta Percha Co. has been obliged to shut down for a week on account of lack of fuel.

As stated above, the prohibition of automobile tires imports remains in force for the present without its having been able to interfere thus far with the flooding of the German market with foreign tires on the expulsion of rubber manufactures from the field they had occupied.

All in all the conditions which await the German rubber industry are not precisely rosy. Of crude rubber it will be able to obtain more than enough but at what cost in comparison with values, besides the everlasting strikes, the demands for high wages, the unwillingness to work and the prospect of nearing communistic troubles.

The Hamburg crude rubber market begins to come to life even if the transactions are still very small. Holland can sell much rubber to Germany—if the dealers there will put up with unfavorable terms of payment and credits. Germany has become a poor country and must pay dearly for many sins she has committed. The great mass of the people, however, did not wish for the war and regarded it throughout as a war of defence.

PRESIDENT OF KOBE-OSAKA RUBBER MERCHANTS' ASSOCIATION.

Y. MIYAGAWA, president of the Kobe-Osaka Crude Rubber Merchants' Association, was born on October 23, 1888, in the city of Hiroshima, Japan. His father being a Samurai of high standing, Mr. Miyagawa was brought up in a very strict home. Later, however, he was converted to the Christian religion and baptized in December, 1904. Having graduated from the Hiroshima Commercial College with honors in March, 1905, he entered the Royal Rubber Works, Kobe, where he learned about rubber goods in general as well as methods of manufacture under Dr. R. Yoshida, one of the greatest rubber authorities in Japan.

Y. MIYAGAWA.

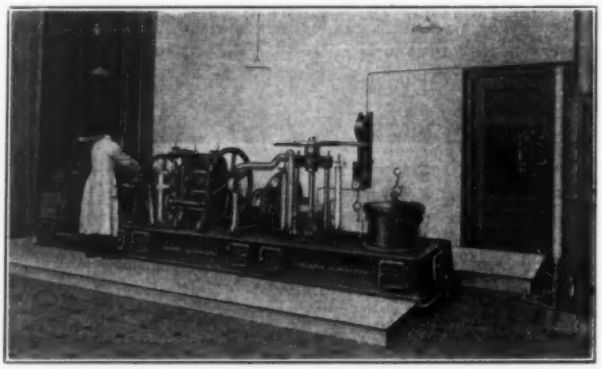
In 1910 Mr. Miyagawa was appointed sales manager of the Standard rubber factory, and in September, 1912, was made manager of the Nagoya branch of the Dunlop Rubber Co. (Far East), Limited. In November, 1913, he decided to go into business for himself and established the firm of Y. Miyagawa & Co., Osaka, importers of crude rubber and exporters of rubber goods. The business prospered, and entrusting this Osaka office to his younger brothers, he started a branch at Kobe, which has since been separated from the Osaka office and is an independent firm at present.

Mr. Miyagawa has visited the Straits Settlements and India, studying rubber market conditions in general. These journeys taught him the need of improving the general conditions under which transactions in crude rubber were being made in Japan, and when the Kobe-Osaka Crude Rubber Merchants' Association was established under his auspices he was appointed president.

He is also a director of the Osaka Rubber Goods Merchants' Association, and is the adviser to the Indian Market Department of the Dunlop Rubber Co. (Far East), Limited. His wide experience and responsible connections entitle Mr. Miyagawa to be regarded as one of the highest authorities in the Japanese rubber trade.

THE DUTCH ARE UP TO DATE.

Very few are aware of the fact that the Government of Holland exercises an exceedingly careful supervision over the rubber and gutta percha industry in the Netherland East Indies, not in a cursory way, but in the way of scientific testing of all types of gums, and reports that are of the greatest value to the planters.



RUBBER LABORATORY MACHINERY, TECHNICAL COLLEGE, DELFT, HOLLAND.

The accompanying illustration relates to the experimental rubber plant erected at the technical college at Delft, Holland. It deals with only one portion of the large department devoted to the rubber mill section. Here are seen a miniature washer, mixing mill, calender, press and vulcanizer, all of the approved type and capable of handling samples of considerable size. The plant is run electrically, and there is also a self-contained steam generating plant. Connected with this department is an up-to-date laboratory equipped with everything necessary for analysis and testing.

A FREE PORT AT STOCKHOLM.

Sweden, having decided to establish a system of free ports, has made a beginning with one in the harbor of Stockholm, which is now open for business, though far from completion. It may take ten years before the plans prepared are fully carried out. As it is, two steamers can now be sent out at once. By next year piers will have been built which will allow steamers drawing 27 feet to discharge. Stockholm is getting ready to handle most of the goods that are to go to other Baltic ports.

THE NIGERIAN METHOD OF STRIKEBREAKING.

Two months' imprisonment with hard labor is the penalty for West Coast of Africa negroes who refuse to work on Sunday, according to a judgment given recently at Calabar in southern Nigeria. A large Pará rubber plantation started tapping and informed the "boys" who had been trained for the work, that they must work on Sundays, and would receive more pay than the other laborers who did not work on that day. After trying it for one Sunday, a few of them organized a strike, after European methods, induced most of the others not to work, threatened those who were willing, and informed the manager that the men would not tap at all unless he stopped Sunday work. The ringleaders were arrested. The magistrate at once found them guilty and told them he could send them up for two years but, as it was a first offence, gave them only two months.

Pará Rubber in Mexico—Some Reminiscences.

By J. L. Hermessen, F.R.G.S.

THE SPECIAL CONTRIBUTION in the October number of THE INDIA RUBBER WORLD, under the heading "Rubber in the State of Vera Cruz, Mexico," has suggested to me the possible interest of some notes regarding Pará rubber in Mexico, by reason, particularly, of the mention of the plantation El Palmar, owned by El Palmar Rubber Estates, Limited, of Glasgow, Scotland. This property possesses the distinction of being (or, since its very existence now is questionable, one should perhaps better say, having been) the pioneer in the experimental cultivation of *Hevea brasiliensis* in Mexico. While many others, in the several and often far separated planting districts of the country (in parts of the States of Vera Cruz and Oaxaca, of the Isthmus of Tehuantepec, and of Tabasco and Chiapas on the borders of Guatemala), had made tentative trials with the tree, in no case within the writer's knowledge had plantings of any area been attempted.

Dr. Pehr Olsson-Seffer was quite well known to me before he was connected with El Palmar, but what is about to be related belongs to the period of the late J. C. Harvey's incumbency as manager there; for by him the enterprise was initiated and under his personal direction carried out.

Mr. Harvey had long previously taken a more than plantonic interest in *Hevea brasiliensis,* and in his garden at Buenaventura, where he had formed a splendid collection of tropical flora, both ornamental and economic, he raised a number of specimens from seed procured from Ceylon—in the first instance, I think, direct from the Government Botanical Station at Peradeniya. These, throughout the years of their growth from slender plants into mature trees of tappable age and size, had

HEVEA BRASILIENSIS AT EL PALMAR.

been the object of devoted care and study on his part, eventuating in a series of systematic tapping experiments, the results of which went to strengthen Mr. Harvey's belief in the suitability of certain sections of the country to the introduction of the Amazon rubber tree, adaptable, as it had seemed in the East, to physiographic conditions differing widely from those of its native habitat. From Buenaventura, under date of April 13, 1913, Mr. Harvey wrote:

I have been spending some three weeks here, sizing up our situation and I think we will go ahead and reconstruct this prop-

HEVEA BRASILIENSIS NURSERY AT EL PALMAR IN 1911.

erty in cacao, coffee and Pará rubber. . . . . Pará is a success on wound response. I have been tapping two or three trees daily for a week, and the yield increases from the single paper-like shaving taken off the lower edge of the first and only incision. Academically, I knew all about this but, tool in hand, doing and seeing results is moving, I assure you. A little arithmetic comes in. Say that we cut out two dry months, April and May, we have ten months; deducting Sundays and possibly five feast days—285 tapping days—say 4 grams dry rubber per tree, or 1.140 kilograms per tree for the year. Cut it in two for young trees, and it makes *Castilloa* look pretty sick. No guesswork, but facts that are demonstrable. The authorities in the Orient say that an expert tapper handles 800 to 1,000 trees per day. If he taps only 500 per day it nets 2 kilos dry rubber per man per day at 4 grams per tree, so that our wage rate still leaves a handsome profit at $1 per pound, United States currency.

A little later (I have no memorandum of the date, but it was almost certainly in the month of May, because it was, as I recall the height of the dry season on the Isthmus of Tehuantepec) I was staying with Mr. Harvey at Buenaventura, and together, for a week, we sallied forth every morning before sunrise, with our tapping paraphernalia, to the ground allotted to *Hevea.* I have to regret the loss, through the vicissitudes of war years, of information upon the results of our operations of which we kept at the time the fullest record. Suffice it to say that they amply confirmed the figures in Mr. Harvey's letter quoted above.

The first planting of *Hevea brasiliensis* at El Palmar, on regular field lines, was done with stumps to the number of several thousand, imported for the purpose from Ceylon. Upon arrival these were put into nurseries, and after they had become acclimatized and generally fairly established they were set out to make their way further under conditions to which they would have to accustom themselves to prove a commercially successful culture. The proportion of plants which survived the preliminary nursery stage was not as good as Mr. Harvey had expected, and he subsequently elected to get *Hevea* seed from Ceylon. This was sown in specially prepared nursery beds, and from the time of germination to that of removal of the plants

to the field they were most carefully tended and guarded against every potential element of danger. Again, unfortunately, details like planting distance, number of trees per acre, etc., are not now available.

In a letter dated Buenaventura, September 26, 1914, which reached me, after a course of some months, at Loja in Ecuador, Mr. Harvey said:

Shufeldt, Clarence and I spent some days last week at El Palnar. Our 50,000 Pará trees are good to look at. Clarence's few trees at San Silverio have cleaned up for the year an average of ¼ pound dry rubber per month per tree, which is more than satisfactory. The largest tree at El Palmar, four years from seed, measures 24½ inches in circumference 1 foot above ground. I am going to try the tool on it this December or January. I expect to be in full swing on a few thousand trees two years from December, as measurements made the other day justify this anticipation. The tree you and I measured at Buenaventura years since—then, I think, it was 13¼, or 15½ inches—now measures 32 inches in circumference 2 feet above ground.

About a year before (to be precise, in the month of August, 1913), when acting as *locum tenens* on the American-owned estate of San Silverio, Oaxaca, in the absence of the resident superintendent, C. M. Harvey, it fell to me to supervise the setting out of some thousands of Pará seedlings from the nursery. There, too, earlier trial growths of *Hevea* had shown the same encouraging development as at El Palmar and, in consequence, upon the recommendation of J. C. Harvey, who was the consulting expert, a quantity of seed had been obtained from Ceylon and some regular plantings started, comprising, if I recollect rightly, five or ten thousand trees at the time referred to. The *Hevea* seedlings were interplanted with young *Castilloa*, a practice which Mr. Harvey had originally adopted on his own private property of Las Palmas, near Buenaventura, with beneficial effect, he thought, the indigenous tree affording the supposedly more delicate exotic some protection against the unfavorable phenomena of the dry season, characterized as it is on the Isthmus of Tehuantepec by a relentless sun and spells of a riotous hot south wind lasting for days at a time. It is in my memory that these plantings suffered severely from the dietary attentions of deer, who evinced a fine taste for young Pará, and I think that we were ultimately forced to employ some sort of fencing arrangement about the trees.

It is greatly to be deplored that events in Mexico since 1913 should have rendered impossible the task of bringing to fruition these very interesting and valuable planting ventures which, when last seen by the writer, bore every promise of success. It is to be feared that nothing can now remain of them, the region in question (within only a short distance of the important coffee center of Córdoba) having been constantly overrun and plundered by rebel bands.

RUBBER PLANTING NOTES.

LOOKING AHEAD IN RUBBER GROWING.

A BRITISH ESTIMATE OF THE FUTURE of rubber production and of rubber consumption by a man in a position to know the facts intimately is sure to attract attention. At a meeting of Harrisons & Crosfield in London on October 27 Mr. George Croll, the chairman, reviewed the rubber situation and compared it with his own forecast made in 1918, before the Rubber Plantations Investment Trust. He then asserted his belief to be that if there had been no war, the consumption of rubber would have been much greater than it was and that he saw no reason why the probable large increase in 1919 could not be absorbed. He thinks there is room for great improvement in rubber statistics, but from a careful examination of the best available his conclusions are as follows:

After making allowance for the accumulation of the 1918 crop, which was exported from the Eastern countries during the first half of 1919, I now estimate the production of plantation rubber for this year at about 320,000 tons, to which 40,000 tons of wild rubber have to be added, making the worlds production of rubber this year 360,000 tons.

His estimate for the 1920 crop is between 360,000 and 370,000 tons; for the 1921 crop, 381,000 tons; for 1922, 403,000 tons, and for 1923, 430,000 tons.

In regard to consumption he expects the United States to import in 1919 about 220,000 tons; the United Kingdom to make a poor showing with 40,000 tons; France 30,000 tons, Italy 15,000 tons, Canada 10,000 tons, Japan 10,000 tons and the rest of the world 25,000 tons, a total consumption of 350,000 tons out of the 360,000 tons produced. The consumption in 1919 will take care of the production and Mr. Croll thinks that that will be true of 1920 and 1921 also.

British capital owns approximately 80 per cent of the plantation rubber industry, which is far from being the case with the consuming end. From July, 1914, to June, 1915, the United States took 74,000 tons of rubber and the United Kingdom 21,000; in the twelve months from July, 1918, through June, 1919, the United States took 180,000 tons and the United Kingdom only 50,500 tons, and as Great Britain has a large transit trade, a great part of this even was reexported as crude rubber.

AVERAGE YIELD OF HEVEA RUBBER.

The amount of *Hevea* rubber yielded per acre on the average in the various rubber plantation districts of India, Ceylon and the British and Dutch East Indies appears in the Bulletin of the Rubber Growers' Association of South India.

	Average Pounds per Acre.		
	1917.	1916.	1915.
Ceylon	312	253	248
South India	218	232	187
Johore	298	283	328
Negri Sembilan	298	283	228
Perak	382	367	353
Selangor	344	340	331
Straits Settlements	247	252	243
Sumatra	326	309	305
Java	322	303	253
Borneo	226	224	170

The highest record in the list was 607 pounds in a Selangor estate in 1917, the lowest 81 pounds in the Straits Settlements in 1916.

CEYLON RUBBER PRODUCTION.

Ceylon in 1918 exported 50,934,460 pounds of rubber, valued at $22,226,268, as compared with 75,781,401 pounds, valued at $44,543,785 in 1917; a decrease of one-third in quantity and one-half in value. The exports in 1918 were smaller than in any other year since 1914. This was due partly to the restrictions on the importation of rubber into the United States and to the removal of rubber from the priority list in the United Kingdom and partly to the restriction of the output by the planters. No average price for the year was computed by the Ceylon Chamber of Commerce. The price in 1916 was 58 cents a pound in 1917 it was 48 cents, in August, 1918, it was 20 cents a pound for crêpe and 18½ cents a pound for ribbed smoked sheets, while toward the end of the year both were selling for about 38½ cents a pound.

RUBBER CULTURE RESEARCH WORK IN BRITISH INDIA.

Professor J. B. Farmer in "The India-Rubber Journal" discusses the report of Dr. Butler, imperial mycologist of the Department of Agriculture in India, regarding the administration of research work in the British possessions in the Far East. The proposal to unite all agencies for research—government, corporation and private—is thoroughly approved, for in all matters of rubber culture the attempt to retain exclusive information seems short sighted.

Concerning Dr. Butler's projects for a central management for research Professor Farmer is apparently skeptical. The division of responsibility between the government administration, the rubber planters and the scientific experts will be a difficult matter to settle in the East. Professor Farmer suggests that a small scientific committee in London be put in charge.

The Balata Industry in the Colony of Surinam.

By J. Barkley Percival.

PRIOR TO 1857 balata was practically unknown, at least to civilized man. The natives of the Guianas are said to have used it for cutlas handles and drinking vessels, but only rarely. In the year mentioned, Professor Bleeknode described it as Surinam gutta percha, which it really is, and not a rubber as so many mistakenly call it.

Exports from Dutch Guiana began in 1881 and were very small—365 pounds. However, by 1911 the product reached some 3,000,000 pounds, increasing almost every year with the single exception of the year 1888, when none was gathered. All told, up to the present time, there has been given to the world fully 30,000,000 pounds of Surinam gutta percha.

The tree from which this valuable gum is obtained is the *Mimusops globosa,* described under eight other names, the commonest of which is Gaertner's *Mimusops balata.* Other names are *Sapota mulleri, Mimusops kauki,* which is Linnaeus' name for the tree, *Mimusops dissecta, Mimusops hookeri, Mimusops ballata,* which is Blume's spelling of Gaertner's title, *Achras balata,* and *Lucuma mamosa.* The Surinam Dutch call it the horse-flesh tree, on account of the appearance of its wood, while the English have corrupted the native "bolletrie" into bullet-tree.

The tree grows to a large size, often attaining a diameter of six feet, has thick, rough bark and reddish wood, as its Dutch name implies. The leaves are glossy, oval and pointed at the tip. The flowers appear in groups surrounded by leaves. The fruit is a berry about the size of a coffee berry, but soft and sweet. The kernel is hard and produces a bitter oil.

A BALATA BLEEDER AT WORK.

Soon after the Dutch Colony began to ship balata, British Guiana and Venezuela entered this field, the three countries named furnishing the bulk of the gum that is marketed.

The tropics furnish scores of different trees yielding a milk which coagulates into a gummy mass, and while the famous "bullet" tree was the foundation of the commercial balata business, and still retains its place as the producer of the best balata, it has never been the sole source of supply. There has been a good deal of "mixing" done in the past, but the laws are so stringent and the collectors so sharp that dishonesty among the bleeders is now almost impossible. Dutch Guiana is remarkably rich in gum-bearing trees so that the temptation is very great to palm off the bastard for the legitimate gum on the market.

Discovery of the varying properties of gum from the different trees has been a gradual matter following the development of commercial balata extraction in Surinam; methods of coagulation are probably as old as the aboriginal use of the gum. That in the Colony has certainly not varied for fifty years, with the exception of isolated experiments toward improvement.

The milk, caught in mud, leaf or calabash below gashes made with a sharp instrument in the bark, is collected in kerosene tins and then it is taken to the camp where it is poured into shallow trays (debrees) which hold from five to thirty gallons. The milk congeals in these trays and the balata is taken off in sheets, successive sheets being removed until the trays are empty with the exception of the mother liquid. These sheets are hung up first over the debrees to drain and then in a roughly constructed shed. When dry they are dispatched to Paramaribo for export to the ultimate market.

There are always tricksters in trade and the balata man is no exception to the rule. Frequently some extremely foreign bodies are found concealed, some perhaps by accident, but the most, however, through intent, in order to make the sheet weigh more. In this way stones, lumps of hard wood and nails have found a temporary resting place between the layers of gum. The laborers are paid according to the amount of balata collected and this, perhaps, is the cause for the temptation of "packing" foreign matter between the sheets.

The yield per tree varies considerably, the flow being affected by changes in meteorological conditions. Trees give at the first tapping an average of one gallon of milk each, equivalent to about five pounds of dry balata. The cuts made in the bleeding of balata are stated to take four or five years before they are entirely healed, and as no tree may be retapped before the incisions are completely healed, that period has to elapse before retapping can be done. Subsequent tappings are said not to yield as well as the first ones. Accurate records, however, are lacking.

For the purpose of the administration of balata-collecting concessions, the colony is divided into blocks—a more easily accessible northern portion and a less accessible hinterland. These blocks are then granted to companies who pay the taxes yearly in advance to the government and in default to pay the taxes on a certain date, all rights to the lands are forfeited immediately. Applicants must give the Crown Lands officer a satisfactory security that there is sufficient means to operate the concessions thoroughly before they are granted.

No balata tree is allowed to be bled which does not measure 36 inches in girth at four feet from the ground. Trees may be bled on only one-half of their girth at any one time, and no tree can be retapped until the previous incisions are completely healed. For bad work or contravention of the conditions under which the concession is issued the concessionaire is held responsible, but he is empowered to, and expected to prosecute any offending bleeders or employes. The government has appointed forest officers to assist the Crown Land officers in inspecting the

work of the collectors—and with many beneficial results.

The gathering of balata is done by black or colored laborers and these have to be registered before they can be employed. They usually obtain advances of money at the time of registration for the purpose of purchasing their bush outfit, implements, etc. On the site a suitable tract is selected for a camp, and rough leaf-covered huts are put up. The debree—a shallow tray in which the balata milk coagulates—is then built and everything is in preparation for the collection of the latex. The balata bleeder now proceeds to locate the exact position of the trees nearest at hand, and makes his plans for collecting. The trees are tested with a small cut in order to ascertain in what condition they are for operating upon, and from these initial cuts an experienced bleeder can readily ascertain which trees will most quickly repay tapping.

During the present year the price of balata made marked variations. At the beginning of the year it was up to four florins[1] the kilogram,[2] but in August it was down to nearly half that figure in the local market. Meanwhile the rival balata from private lands is also bringing about two florins the kilogram in the city market, and a crop of nearly 50,000 kilos is predicted.

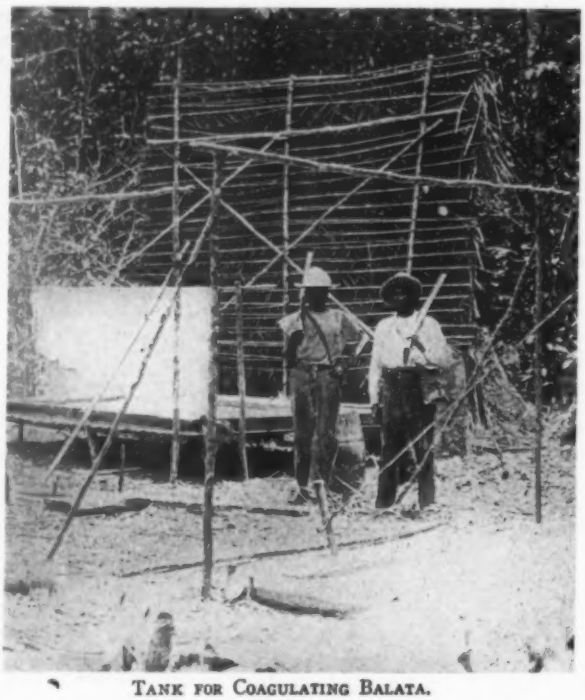
In spite of this competition, which has for the last four years dictated prices in the local markets, the balata from concessions maintains its favored position on account of its purity and excellence.

The most spectacular feature in the prices of balata is that for the years 1909-12, during which the article brought unheard of prices. These were the days when the balata merchant—not the collector—found his hands full of money. He could sell balata and make a profit at an average price of one florin[1] and fifty cents the kilo, while the world's market offered about seven guilders[3] and fifty cents for each kilogram. This golden shower, following upon other periods of high prices in the early 'nineties and remoter times acted on the balata merchant in a manner that convinced him firmly that good times were the normal thing; that if periods of bad luck came they would pass in the future as they had passed in other years, and that, in fact, "something always comes along to help the Surinamer" in spite of crude methods of collection, unsystematized economic methods, enormous export duties and all the other difficulties against which Dutch Guiana balata has to struggle. Although the colony of Dutch Guiana has produced large quantities of balata since the inception of the industry, there are yet unheard of quantities awaiting exploitation with the advent of capital, which will certainly come along sometime in the near future.

It may be interesting to describe the life of the average balata bleeder. He gets up in the morning—that is rolls out of his hammock—at four o'clock, and lantern in hand, for it is dark until six, sets out with his cutlas (machete) for gashing the trees, or for clearing the paths on his round of tapping. He gashes each tree hastily, fixing a calabash below each wound, visiting each one of his hundred trees and returning by the outer path to his hut, where his woman, if he has one, has prepared his coffee. More generally he is alone, and in that case he proceeds to light his fire and drip his own coffee.

Later in the morning he must make a second round if the milk is not to coagulate in the calabashes. He takes his kerosene tin and tips the contents of each calabash into it, carefully inverting the calabash on a bit of stick at the tree's foot. When he returns he has perhaps three or four liters of milk, which must now be coagulated in the debrees.

A bleeder often walks from six to ten miles a day, for distances between each of his trees may be long ones; there are 80 non-balata trees to each balata in the average Guianese forest. He works from four in the morning until sundown, or more or less than 14 hours a day; small wonder if he keeps Saints' days now and again, or spends a merry week-end drinking rum.



TANK FOR COAGULATING BALATA.

It is said to be good work if the bleeder can make 50 liters in two weeks; he is more likely to take a month. When he completes one of the sheets, he takes it to the foreman, who is in much the same position as the "grubstaker" of early California gold mining days, and who is remarkably lucky if he comes out with any amount of money in hand at the end of a season. Sometimes he does, and is then likely to arrive in Paramaribo with more guilders than his accustomed pockets can conveniently hold, and proceeds to get rid of his pile in a week or two. There are exceptions, where the collector goes back with savings made in the city, and the proprietor naturally gets the best of the business of this season.

In too many cases the collector has neither rioted nor saved at the end of a season's work; he has been charged a comparatively tremendous sum for each scant item of food and equipment. It is more easy than reasonable to blame the concessionaire for this high price; he has had in his turn to pay high for imported goods from the United States and he is taking the risk of the balata collectors failing to make good, whether from incompetence or sickness. These are not healthy regions, and many men become incapacitated or die in the forests; their successors pay their debt to the company, albeit unconsciously.

It is calculated that there are at least 10,000 men engaged in the balata collecting business in Surinam; they work on an average only 160 days in the year, produce in that time about 800 pounds of balata which is drawn from 150 to 200 trees. Some experts in the business say that the bleeder could, if he chose, work eight months in the year instead of less than six which is more common, but one of the main attractions of the life is that the collector of balata is able to work when he pleases, lay off for a day or two, have a good time when he feels inclined and can go home to see his family when, if ever, he saves up enough money. His rewards are, however, so largely discounted by the inflated prices which he pays for the miserable supply of food on which he supports life that it is remarkable that this industry is as well fed with labor as it is. Nothing but the hope of easy money, which has come at times of high balata prices—a lure akin to that of the gold mine—takes men into the Surinam forests.

One suggested remedy for the exorbitant values placed upon food-stuffs is that the state should provide commissary stations

[1]One florin equals $0.402 United States currency.
[2]One kilogram equals 2.2 pounds.
[3]One guilder equals $0.40 United States currency.

where supplies could be bought at reasonable prices; such a system, honestly carried out, would perhaps help to put economics on a better footing, but so far the idea remains an idea.

Many advanced countries hold fast to their faith in untaxed exports. It is a doctrine with much to recommend it, especially

ON THE MARONI RIVER.

perhaps in the case of manufacturers, but it is one which the South American countries cannot yet afford to follow. The state revenues are thus maintained, and balata has been the favorite milch cow of the authorities. It has paid in the past, and still is paying one-third of its official value in various export duties. Almost without exception those interested in the industry think that export taxes must be reduced; that they must in fact be reduced to meet conditions of the present day, if the industry is to last.

It must not be supposed that a decline or even the extinction of the balata industry in Dutch Guiana would mean the ruin of the colony. The threat of declination has rather done good in forcing the attention of industrialists to other fields than that of the collection of the latex of the balata tree. During 1917 there occurred a stimulation for agricultural pursuits, and several thousands of acres were cultivated with rice and other cereals and food roots, while the cattle industry received more serious consideration. There are vast uplands of pasture country which will be valorized when the world becomes more fully aware of the rapid contraction of cattle feeding grounds in other regions.

There have been, however, some important changes made during this year. In April the Balata Company Suriname acquired for a respectable amount the rights held by Brown & Co. on certain blocks, and it is rumored that the Consolidated Balata & Rubber Estates operating in British Guiana will soon take over for a good round figure some of the principal concessions held by local concerns. With the arrival of fresh capital and new blood it is expected that the industry will be placed on a still more firm and lasting basis.

The exports from the colony during the year 1918 were 663 tons against 887 tons in 1917, 765 tons in 1916, and 210 tons in 1915. The small output of last year is mainly due to the scarcity of labor; the best bleeders migrated to French Guiana where inducements were better than in the colony and where the workers are not so much controlled. A very large crop is anticipated for the present year, however, owing to the fact that there has been a rush of men from Demerara since the armistice was signed. Local restrictions having been partly removed, it is fair to say that balata will resume its former position as an important industry the moment conditions return to normal.

For five long years the balata boys experienced very hard times; they worked under some most difficult circumstances; the great scarcity of American foodstuffs on the one hand, and the uncertainty of receiving their wages on the other (owing to the world's struggle, which cut off the colony practically from the outside) were causes of great dissatisfaction amongst them. Now the worst is past and there is daily evidence of renewed interest to enter into contracts and be once more cheerfully earning their daily bread.

TRINIDAD RUBBER CULTURE.

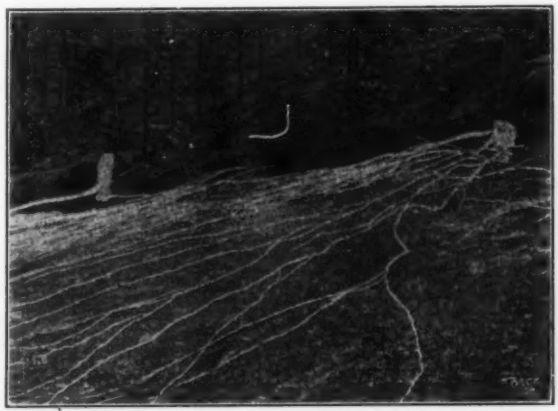
Rubber in the island of Trinidad is still in the experimental stage though the Report of the Department of Agriculture of Trinidad and Tobago for 1918 says that it continues to expand. The exports were 39,517 pounds, nearly double the 22,224 pounds of 1917. On one estate 16,000 *Hevea* trees were tapped; on some scrap was made from *Castilloa* but many *Castilloa* trees have been cut down because the yield was less than had been expected. The report regrets the experimentation.

Hevea is apparently the best rubber tree for the colony; it flourishes not only in the moist districts but in places that were thought too dry for cocoa. Trees at St. Clair yielded an average of 2½ to 4¼ pounds in the last seven years when the average rainfall was only 56½ inches. Interesting experiments in tapping are reported and no leaf disease or other disease or pest has appeared so far.

THE ROOT SYSTEM OF HEVEA.

At the *Horto Florestal* of the *Seringal Miry*, the experiment station in the State of Amazonas of the Rubber Tree Club of Manáos, an interesting investigation has been made of the root system of *Hevea brasiliensis*, as shown in the illustration.

The trees in the grove are seven years old and planted thirteen feet apart. The roots on one-quarter of the circumference have



("*A Seringueira.*")

ONE QUARTER OF THE ROOT SYSTEM OF A HEVEA BRASILIENSIS, EXTENDING TWENTY-SIX FEET FROM THE TRUNK.

been uncovered here for a distance of over twenty-six feet from the trunk. The picture demonstrates graphically to what extent the rubber trees call on the soil for nutriment and is evidence of the necessity of wide planting.

Recent Patents Relating to Rubber.

THE UNITED STATES.

ISSUED NOVEMBER 4, 1919.

No. 1,320,393. Fountain pen. E. M. Houston, Minneapolis, Minn., and W. A. Houston, Sioux City, Iowa.
1,320,404. Split rim for tires. T. and A. Mohn, Red Wing, Minn.
1,320,417. Heel with rubber section. G. C. Seymour, New York City.
1,320,513. Rubber brush for washing bottles. C. K. Volckening, Brooklyn, N. Y.
1,320,518. Tire, multi-chamber type. O. Zaucan, New York City.
1,320,540. Swimming apparatus with pneumatic cushion. F. Fedzyna, New York City.
1,320,596. Blotter with sponge rubber body. Shizutaro Aoki, Shimokyo Ku, Kioto, assignor to Takeji Tokuhisa, Tokio—both in Japan.
1,320,617. Bead anchorage for cord tires. C. G. Hoover, assignor to The Goodyear Tire & Rubber Co.—both of Akron, O.
1,320,648. Pessary. H. M. Potter, Bloomville, N. Y.
1,320,675. Piston packing of rubber-impregnated fabric. G. Christenson, Jamaica, assignor to H. W. Johns-Manville Co., New York City—both in New York.
1,320,708. Tire liner. M. Pianko, Chicago, Ill.
1,320,737. Suspensory bandage. A. R. Chisholm, New York City.
1,320,900. Respirator. E. I. McKesson, Toledo, O.
1,320,935. Gas mask. N. Schwartz, New York City.

ISSUED NOVEMBER 11, 1919.

1,321,188. Self-filling fountain pen. H. Catucci, assignor to Mabie, Todd & Co.—both of New York City.
1,321,206. Wheeled toy with propellor operated by rubber band. G. B. Hansburg and E. M. Lyons—both of New York City.
1,321,220. Tire with inner tube composed of rubber, sponge rubber, and fabric. E. H. Layman, Pacific Beach, Calif.
1,321,265. Appliance for telephone receiver. J. M. Wagner, assignor by direct and mesne assignments to W. L. McKay—both of Chicago, Ill.
1,321,266. Stethoscope. A. H. Wilkinson, Jacksonville, Fla.
1,321,301. Pneumatic cushion. W. A. Gibbons, Flushing, N. Y., assignor to the Rubber Regenerating Co., Naugatuck, Conn.
1,321,403. Pneumatic cord tire. B. L. Stowe, Jersey City, N. J., assignor to Morgan & Wright, Detroit, Mich.
1,321,451. Rubber-dam clamp with multiple jaw. J. W. Ivory, Philadelphia, Pa.
1,321,452. Rubber-dam punch. J. W. Ivory, Philadelphia, Pa.
1,321,466. Tire with circumferential rib extended within and vulcanized to body portion to form air spaces. A. J. Meyer, Chicago, Ill.
1,321,545. Resilient wheel with pressure-exerting members of rubber. C. A. O'Neill, Revere, Mass., assignor to Demountable Spring Tire Co., New York City.
1,321,556. Pneumatic tire. J. K. Ross, Chicago, Ill.
1,321,688. Reinforced tire. T. J. Whalen, Kittanning, Pa.
1,321,719. Wheel rim structure composed of sections with vulcanizable facing on tread part, a vulcanizable tread band, etc. W. G. Chipley, Omaha, Neb. (Original application divided.)
1,321,791. Tire valve. E. E. Holt, Chicago, Ill.

ISSUED NOVEMBER 18, 1919.

1,321,833. Inflater and tester for toy balloons. O. G. Lyon, Akron, O.
1,321,879. Tire with rubber core. S. J. Barton, Chicago, Ill.
1,321,188. Demountable rim for tires. G. J. Clayton, Lakewood, N. J.
1,322,018. Corset with elastic inserts. J. L. Holt, Portland, Ore.
1,322,067. Transmission belt of rubberized fabric with leather ends. A. A. Somerville, Flushing, assignor to New York Belting & Packing Co., New York City—both in New York.
1,322,095. Collapsible rim for tires. C. B. Deeds, Savanna, Ill., assignor by mesne assignments to Lightning Change Rim Corp., Berrien Springs, Mich.
1,322,096. Collapsible rim for tires. C. B. Deeds, Savanna, Ill., assignor by mesne assignments to Lightning Change Rim Corp., Berrien Springs, Mich.
1,322,202. Curved woven puttee with elastic threads increasing in diameter from edge to edge. J. M. Roche, New York City.
1,322,276. Catamenial napkin with elastic straps. A. Wolff, New York City.
1,322,281. Sectional elastic tire filler. F. L. Bailey and J. H. La Grant, Wichita, Kans.
1,322,285. Cushion heel. I. E. Bremberg, Chicago, Ill.
1,322,321. Armored pneumatic tire. T. C. McEwen, Belleville, N. J.

ISSUED NOVEMBER 25, 1919.

1,322,529. Demountable rim for tires. R. S. Bryant, assignor by mesne assignments to The Standard Parts Co.—both of Cleveland, O.
1,322,550. Tire interliner composed of metallic wool and graphite between layers of asbestos. T. V. Edmunds, Winston-Salem, N. C., assignor of ½ to R. G. Parker.
1,322,583. Tire valve. H. P. Kraft, Ridgewood, N. J.
1,322,608. Cushion tire. H. N. Palmer, Griswoldville, Mass.
1,322,636. Puncture-proof tire. D. W. Skogsbergh, Chicago, Ill.
1,322,639. Shampoo comb. C. H. Snider and L. D. Magrath, Conway, S. C.
1,322,685. Wheel with rim composed of cylindrical units shiftable to bring new bearing face into position, etc. J. A. Franklin, Pittsburgh, Pa.
1,322,720. Massage machine. Glenn S. Noble, Chicago, Ill.
1,322,734. Flexible, inflatable, heat-resistant rubber article for use in heat-curing sulphurized rubber tires. H. E. Smith, Cleveland Heights, O.
1,322,739. Armored tire. F. H. Van Loozen, Cleveland, O.
1,322,777. Pneumatic tire. M. C. Frank, Piedmont, assignor of ⅓ to N. Le Vene, San Francisco—both in California.
1,322,782. Pressure gage for tires. B. G. Gilbough, Los Angeles, Calif.
1,322,806. Life-saver for aviators. W. Marshall, Bridgeton, assignor of ½ to J. Westcott, Ocean City—both in New Jersey.
1,322,828. Life-saving device for use at sea. G. Salaman, London, Eng.
1,322,836. Garment supporter. E. M. Silvermann, assignor to Harris Suspender Co., a copartnership composed of E. M. and H. W. Silvermann—all of New York City.
1,322,862. Wrist fountain pen. I. Ziporyn, New York City.
1,322,884. Pressure gage for tires. E. Edelmann, Chicago, Ill., assignor to A. Schrader's Son, Inc., New York City.
1,322,905. Dust cap for tire valves. A. L. Just, Syracuse, N. Y.
1,322,984. Ice Bag. P. R. Wesley, assignor to Davol Rubber Co.—both of Providence, R. I.
1,323,060. Resilient wheel. E. Jacqmain and J. Kucharek, Brussels, Belgium. (Renewed.)
1,323,079. Pneumatic tire. J. J. Luck, San Antonio, Tex.
1,323,160. Elastic tire with soft rubber core and pneumatic tube. A. A. Crozier, London, Eng.
1,323,181. Anesthetic apparatus. W. V. Goodfellow, Los Angeles, Calif.
1,323,193. Traction ring for pneumatic and other cushion-tired wheels. G. C. Lambert, St. Paul, Minn.
1,323,217. Ventilating mask for patients. G. E. Darrow, San Francisco, Calif.

THE DOMINION OF CANADA.

ISSUED NOVEMBER 4, 1919.

193,571. Non-slipping rubber heel. B. W. Brockett, Cleveland Heights, O., U. S. A.
193,606. Solid tire. E. J. Hahn, Merrill, Ia., U. S. A.
193,640. Fastener for rubber heels. F. A. Nolan, St. Paul, Minn., U. S. A.
193,646. Heel pad. S. Schulhoff, Trenton, N. J., U. S. A.

ISSUED NOVEMBER 11, 1919.

193,736. Metatarsal arch support. L. Adair, Toronto, Ont.
193,778. Inner tube. A. E. Henderson, Toronto, Ont.
193,802. Rubber heel. F. A. Nolan, St. Paul, Minn., U. S. A.
193,810. Rubber stamp of the band type. F. Pitman, East Kew, Victoria, Australia.
193,831. Rubber-faced foot-pedal for automobiles. J. B. Stewart, Winnipeg, Man.

ISSUED NOVEMBER 18, 1919.

193,932. Demountable rim for tires. B. E. Braught, Cartwright, N. D., U. S. A.
193,971. Fountain pen. L. L. Gugel, Berea, Ky., U. S. A.
193,984. Pneumatic tire. E. F. Jones, Epson, Auckland, N. Z.
193,998. Semi-circular solid rubber tire with metallic tread. J. F. Loughran, Chehalis, Wash., U. S. A.
194,005. Gas mask. G. A. Mickleson, Vancouver, B. C.
194,019. Pneumatic tire. D. C. Roberts, Trenton, N. J., U. S. A.
194,051. Reinforced tire. A. W. Yambert, Sycamore, O., U. S. A.
194,073. Felt-lined rubber boot. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of F. Sage, Hastings, Mich., U. S. A.
194,102. Sectional tire. M. G. Bunnell, Decatur, and R. T. Whelpley, Chicago, assignee of a ⅔ interest—both in Illinois, U. S. A.
194,107. Skirt belting with rubber gripping elements. D. Basch, New York City, assignee of M. L. Basch, Brooklyn—both in New York, U. S. A.
194,114. Tire tread. J. M. Gilbert, New York City, assignee of F. B. Carlisle, Davisville, R. I., U. S. A.

ISSUED NOVEMBER 25, 1919.

194,072. Airplane structural element coated with hard rubber, etc. The Canadian Consolidated Rubber Co., Limited, Montreal, Que., assignee of W. A. Gibbons, Flushing, L. I., N. Y., U. S. A.
194,180. Pneumatic suspension. A. Joey, Zurich, Switzerland.
194,189. Rubber-coated catgut for ratchet stringing. S. G. Lewis, Greensburg, Pa., U. S. A.
194,235. Reinforced tire. W. I. Varner, Athens, Ga., U. S. A.

THE UNITED KINGDOM.

ISSUED NOVEMBER 5, 1919.

132,099. Child's overall, with elastic inserted in hem. A. A. Fuller, 34 Upper Tollington Park, Finsbury Park, London.
132,109. Rubber stops, pads, buffers, etc., for door-stops, walking sticks, etc. F. C. Jones, 212 Upper Thames street, London.
132,110. Heel pad. J. Leach, Penmaen, Colwyn, Denbigshire.
132,181. Arch support. W. H. Robson and A. Powell, 7 New Oxford street, London.
132,204. Rubber soles for boots. W. J. Wicks, 244 Hoxton street, Hoxton, London.
132,206. Dating stamp, band type. W. T. Brassington, 29 Hockley street, Birmingham.
132,211. Reinforced composition soles. J. Y. Johnson, 47 Lincoln's Inn Fields, London. (F. Kellar, 208 Chancellor street, Philadelphia, Pa., U. S. A.)
132,378. Resilient blades for supporting billiard table cushions, with or without layers of sheet rubber between layers of wood. F. A. Alcock, 155 Elizabeth street, Melbourne, Victoria, Australia.
132,444. Revoluble rubber heel. W. H. Barnes, 271 Great Ancoats street, Manchester, and H. Vaudrey, Sandiway House, Altrincham, Cheshire.
132,502. Inflatable cushion for insertion between inner and outer soles of boots. G. E. C. Gerber, 36 rue des Chaussetiers, Clermont-Ferrand, Puy de Dôme, France.

ISSUED NOVEMBER 12, 1919.

132,579. Bifurcated, rubber-sheathed clip for attaching electric cables to balloon or kite cables, etc. E. G. Cleverly, Royal Air Forces, Rochampton, London.

Chemical Patents will be found on page 220. Machinery Patents on pages 222, 223.

132,582. Collapsible and folding boat of waterproof material, having inflatable side chambers. A. E. Ford, 42 North Audley street, London.

132,645. Fabric lining for outer covers of pneumatic tires, made of textile and rubber covered wires. N. I .Lipman, 125 Euston Road, London.

132,675. Ironing machine with rubber pad on lower board. L. W. Goold, 5 Corporation street, Birmingham. (American Laundry Machinery Co., Norwood Station, Cincinnati, O., U. S. A.)

132,692. Composition heels. F. A. Nolan, 216 New York Life Building, St. Paul, Minn., U. S. A.

132,746. Squilgee for washing windows. W. E. Moser, 11 Western Road, Merton Abbey, Surrey.

132,750. Adjustable rubber protector for soles of boots and shoes. W. J. Wicks, 244 Hoxton street, Hoxton, London. (Refers to Specification No. 132,204 above.)

ISSUED NOVEMBER 19, 1919.

132,902. Brushes for shaving, etc., made from strips of rubber slit to form bristles, some of which are perforated. H. Tomlinson, 5 George street, Hedon, Yorkshire.

132,927. Ankle joints of artificial feet, with rubber buffers, C. E. Hadlow, 88 Mortimer Road, Kensal Rise, London, and Pedestros, Limited, I Higham Road, Chesham, Buckinghamshire.

132,935. Non-slipping rubber block for end of walking stick, crutches, etc. J. T. Akerman, Mountcombe, Surbiton, Surrey.

132,946. Pads for cleaning windows, held in place by rubber bands, W. B. Fife, 9 Wyndham Road, Wallasey Village, Wallasey, Cheshire.

132,950. Bubble-blowing toy fitted with rubber tube and bulb. H. H. Griffiths, 8 Princess Road, Edgbaston, Birmingham.

132,962. Hand shields for cycles, etc. M. E. Parker, Ashley House, Galgate, Lancaster.

ISSUED NOVEMBER 26, 1919.

133,058. Rubber stoppers reinforced with insertion of metal, glass, etc. L. Goldmerstein, 29 West 39th street, New York City, U. S. A. (Not yet accepted.)

133,112. Kite balloon with funnel-shaped air inlet leading to ballonet and fitted with flap valve, etc. E. C. R. Marks, 57 Lincoln's Inn Fields, London. The Goodyear Tire & Rubber Co.,

133,215. Pad for end of crutch, etc. R. L. G. Marix, 3 Clifford street, 1144 East Market street, Akron, O., U. S. A.) Bond street, London.

NEW ZEALAND.

ISSUED OCTOBER 16, 1919.

40,850. Splint rim for tires. W. W. McRae, Waikari, North Canterbury, N. Z.

ISUED OCTOBER 30, 1919.

41,860. Artificial foot and leg connected by piece of rubber forming ankle joint. J. Wyllie, Kershaw's Engineering Works, Nelson, N. Z.

TRADE MARKS.

THE UNITED STATES.

NO. 106,167. The word Sosco—rubber erasers, etc., Spokane Office Supply Co., Spokane, Wash.

111,951. The representation of a kangaroo sitting within a tire—rubber and fabric tires and rubber inner tubes. Quick Tire Service, Inc., New York City.

113,146. The letters I S C A—felt and rubber insoles. Peterson-Franzen & Co., Chicago, Ill.

113,194. The word WONPIECE—rubber button bases, etc. Kabo Corset Co., Chicago, Ill.

113,751. The word CAREY—packings of asbestos, rubber, textiles, etc. The Philip Carey Manufacturing Co., Lockland, O.

114,571. The word EWALD—tire retreading and stapling machines, etc. Romort Manufacturing Co., Oakfield, Wis.

114,584. The word MASON inside an oval—rubber and fabric or rubber composition tires and tubes. The Mason Tire & Rubber Co., Kent, O.

114,876. Representation of bust of a Vyking and the letters YKING within the letter V, all superimposed on a tire—rubber tires. The Combination Rubber Manufacturing Co., Bloomfield, N. J.

115,259. The word DURRAR between parallel lines of stenciled dashes—stitched and impregnated canvass belting. The Rossendale-Reddaway Belting & Hose Co, Newark, N. J.

116,127. The word CRESCENT within a crescent—fountain pens. The Conklin Pen Manufacturing Co., Toledo, O.

116,141. The word SHALER within a conventionalized rectangle—vulcanizers. C. A. Shaler Co., Waupun, Wis.

116,668. The word FLEXO—garters, etc. A. Stein & Co., Chicago, Ill.

117,449. The word VADACOL on a scroll—rubber tires. The Dry Climate Tire Manufacturing Co., Arvada, Colo.

117,904. Representations of back view of body of pugilist within a tire, both behind the word RESISTO within a rectangle—suspenders, belts, garters, etc. Joseph Silberman, Baltimore, Md.

118,041. The word IMPERIAL—mechanical rubber goods. Boston Belting Corp., Boston, Mass.

118,108. The words PARA BOND within a shaded circle—tire patches. Emco Manufacturing Co., Inc., Binghamton, N. Y.

118,447. Representation of a label bearing a scroll, a reindeer within concentric circles, and corner ornaments—elastic webs. W. Preston & Son, Limited, Leicester, England.

118,448. The word RACINE—rubber and fabric tires. Racine Rubber Co., Racine, Wis.

118,532. The words DRI-PED within a diamond—rubber, fabric, leather and combination shoes, boots, slippers, and weltings, William Walker & Sons, Limited, Bolton, England.

118,631. The words AMERICAN AKRON so combined that the A and N form the first and last letters of both words—pneumatic and rubber tires, inner tubes, patches, reliners, tire boots and flaps, pneumatic rubber bags for making repairs, valve pads and retread bands. The American Rubber and Tire Co., Akron, O.

119,296. The words MASTER RED—inner tubes. Essex Rubber Co., Trenton, N. J.

119,487. The words "LET THE TIRE BREATHE"—tire-ventilating valves. Thomas Colden McEwen, Belleville, N. J.

119,508. The words FOAMITE FIREFOAM arranged over one another so that the letter F begins both words—hand-operated portable and stationary fire extinguishers. Foamite Firefoam Co., New York City.

119,746. The word ROAMER—rubber tires and tubes. The National Tire & Rubber Co., East Palestine, O.

119,829. The words GOODYEAR TRIANGLE—weekly house organ. The Goodyear Tire & Rubber Co., Akron, O.

120,052. The words DOG BOY—rubber heels. Granger Vacuum Rubber Heel Co., Cleveland, O.

120,077. The word RESEVO—fountain pens. A A. Waterman & Co., Chicago, Ill.

120,137. The word TREX—tire-removing tools. Trexler Rim Compressor Co., Philadelphia, Pa.

120,228. The word UZOLD—rubber tires. The Uzold Tire & Rim Co., Cleveland, O.

120,453. The words TOM BROWN—rubber and rubber and leather shoes, etc. Filene's Sons Co., Boston, Mass.

120,477. The word CORONA within a double-outlined diamond-inner tubes, tires, and rubber packing. Corona Rubber Reclaiming Co. (now by change of name Corona Rubber Manufacturing Co.), Philadelphia, Pa.

120,731. The word CHERUB—waterproof diaper covers. The Warner Bros., Co., Bridgeport, Conn.

121,101. The words AM-ER-NAT—rubber boots and shoes, etc., American-National Shoe & Leather Corp., New York City.

121,104. Representation of an Indian's head above the words AM-ER-NAT, within the outline of an arrow-head—rubber boots and shoes, etc. American-National Shoe & Leather Corp., New York City.

121,151. Representation of a girl's head with a piece of chewing gum held between the lips and the words "GETS IT" above the head—chewing gum. David Millhauser. New York City.

121,377. The word SACO-RUBBERS, etc. J. G. Asay Co., Inc., Philadelphia, Pa.

121,481. The words DRI-BOY—raincoats. New York Mackintosh Clothing Co., Mamaroneck, N. Y.

121,482. The words DRI-GIRL—raincoats. New York Mackintosh Clothing Co., Mamaroneck, N. Y.

121,606. The words ANTI-PYRE—chewing Gum. George W. Todd, Omaha, Neb.

THE DOMINION OF CANADA.

25,326. The word CONDENSITE—phenol-methylene liquid, semi-solid and solid plastic compounds. Condensite Co. of America, Bloomfield, N. J., U. S. A.

25,334. Representation of Mephisto head on background formed by the letters "AB"—insulated cables, etc. American Bosch Magneto Corp., Brightwood, Springfield, Mass., U. S. A.

25,357. Representation of a booted swastika—rubber soles or pads for heels. The St. Helens Cable & Rubber Co., Limited, The Electric Cable & Rubber Works, Bank Quay, Warrington, Lancaster, England.

25,401. The word DEFIANCE—all kinds of rubber goods. Van der Linde Rubber Co., Limited, Toronto, Ont.

25,403. The initials "A. H." in heavy block letters contacting and united by a bar forming the cross arms of both "A" and "H" and extending in both directions beyond the initials—rubber and other kinds of tires, soft rubber goods, druggists' sundries, foot-ball bladders, etc. Ames Holden Tire Co., Limited, Montreal, Que.

25,404. The initials "A. H. M.", the "A" contacting with the "H" and contiguous legs of the "H" and "M" merged in a single leg, the initials being united by an arm forming the cross arms of both "A" and "H" and extending in both directions beyond the initials—rubber and other kinds of tires, soft rubber goods, druggists' sundries, foot-ball bladders, etc. Ames Holden Tire Co., Limited, Montreal, Que.

25,407. The initials "A. H. M." and the word "SYSTEM," the letter "A" contacting with the "H" and the contiguous legs of the "H" and "M" merged in a single leg, and the initials and the word "SYSTEM" being inclosed in a circle containing a black background—rubber and other goods. Ames Holden McCready, Limited, Montreal, Que.

25,414. The word PHILCO—battery separators or retainers of rubber. Philadelphia Storage Battery Co., Philadelphia, Pa., U. S. A.

THE UNITED KINGDOM.

385,760. Representation of a winged foot dividing the word GOODYEAR—goods of rubber and gutta percha not in classes other than No. 40. The Goodyear Tire & Rubber Co., Akron, O., U. S. A. (Care of Marks & Clerk, 57-58 Lincoln's Inn Fields, London, W.C.2.)

388,539. The word REGENT—elastic garters, sleeve bands, hat cords, etc. W. J. Adams & Co., copartnership, 20 Mount street, Manchester.

389,310. The word FOAMITE—fire extinguishing apparatus. MacAndrews & Forbes, Limited, 2 Broad street Place, London, E. C. 2.

389,616. Representation of a label bearing the initials C. L. & S. and the words CHARLESON SERIES SUBEBONY WARE—toilet receptacles, glove stretchers, handles of buttonhooks, etc., of vulcanite. C. and L. C. Lane, copartners, 58 Corporation street, Birmingham.

390,110. The words FOAMITE FIREFOAM—fire extinguishing apparatus. MacAndrews & Forbes, Limited, 2 Broad street Place, London, E. C. 2.

390,111. The words FOAMITE FIREFOAM—fire extinguishing systems and plant. MacAndrews & Forbes, Limited, 2 Broad street Place, London, E. C. 2.

390,112. The words FOAMITE FIREFOAM—fire extinguishing compounds. MacAndrews & Forbes, Limited, 2 Broad street Place, London, E. C. 2.

392,104. Representation of a label bearing a lion above a pile of tires and the words NORTH BRITISH CLINCHER MOTOR TYRES—rubber tires. The North British Rubber Co., Limited, Castle Mills, Fountainbridge, Edinburgh, Scotland.

392,385. Representation of a signature E. I. M. GAYFER—sanitary belts. E. I. M. Gayfer, 11 Green street, Charing Cross Road, London, W. C. 2.

393,190. The word HERMETIC—brake blocks, driving belts, and matting of rubber or similar materials. The Self-Sealing Rubber Co., Limited, Ryland street, Birmingham, Warwickshire.

393,191. The word HERMETIC—French chalk and dressing for improving the appearance of tires and other rubber articles. The Self-Sealing Rubber Co., Limited, Ryland street, Birmingham.

393,338. The word FIXAGEIPS—rubber heels. J. Giraud, 96 rue de Rivoli, Paris, France. (Care of Marks & Clerk, 57-58 Lincoln's Inn Fields, London, W. C. 2.)

393,611. The word FLAPPER—rubber sponges, etc. G. W. Beldham, Boston Lodge, Windmill Road, Ealing, Middlesex.

393,940. Representations of a label with a checkered border bearing within a circle the picture of a light-house and rocks; against this as background the figure of a man putting on a raincoat; the the words DRYCO RAINCOATS FOR FATHER AND SON, FOR RAIN OR SHINE. BARNETTS THE COAT HOUSE—raincoats. Mark Barnett, trading as Barnetts, 24 Scotland Road, Nelson, Lancashire.

393,971. The word WINBURY—dental rubber, springes, etc. H. Winter, 40 Aldermanbury, London, E. C. 2.

394,027. The word SCULPTÉ—rubber tires, etc. Société Generale des Etablissements Bergougnam, 8 Boulevard Berthelot, Clermont-Ferrand, Puy de Dôme, France. (Care of Marks & Clerk, 57-58 Lincoln's Inn Fields, London, W. C. 2.)

394,718. The word FLEXOR—rubber tires. The Dunlop Rubber Co., Limited, 150-152, Clerkenwell Road, London, E. C. 1.

395,528. The word FIBRAZ—vulcanizing compounds for repairing tires. Harvey Frost & Co., Limited, 148-150 Great Portland St., London, W. 1.

NEW ZEALAND.

15,816. The word SAVOLD—rubber tires and tubes, and tire casings. Solomon Harry Goldberg, 1918 Prairie avenue, Chicago, Ill., U. S. A.

DESIGNS.

THE UNITED STATES.

NO. 54,063. Tire. Patented November 4, 1919. Term 14 years. J. Christy, Cleveland, assignor to The Portage Rubber Co., Barberton—both in Ohio.

54,070. Tire casing. Patented November 4, 1919. Term 14 years. F. S. Dickinson, New York City.

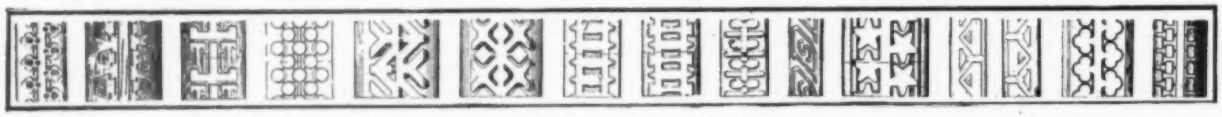
54,090. Tire. Patented November 4, 1919. Term 14 years. G. F. Hoffman, Akron, O.

54,109. Surf rider. Patented November 4, 1919. Term 3½ years. J. P. McCarty and F. W. Falck, Los Angeles, assignors to Pneumatic Surf Fish Co., San Francisco—both in California.

54,114. Tire. Patented November 4, 1919. Term 14 years. C. L. Moody and T. Midgley, Springfield, Mass.

54,120. Tire. Patented November 4, 1919. Term 7 years. E. S. Phillips, assignor to The Yale Tire & Rubber Co.—both of New Haven, Conn.

54,121. Tire. Patented November 4, 1919. Term 7 years. E. S. Phillips, assignor to The Yale Tire & Rubber Co.—both of New Haven, Conn.



54,063 54,070 54,090 54,114 54,120 54,121 54,122 54,123 54,124 54,143 54,153 54,185 54,186 54,198

54,122. Tire. Patented November 4, 1919. Term 14 years. R. M. Pierson, Akron, O., assignor to The B. F. Goodrich Co., New York City.

54,123. Tire. Patented November 4, 1919. Term 14 years. R. M. Pierson, Akron, O., assignor to The B. F. Goodrich Co., New York City.

54,124. Tire. Patented November 4, 1919. Term 14 years. R. M. Pierson, Akron, O., assignor to The B. F. Goodrich Co., New York City.

54,143. Tire tread. Patented November 4, 1919. Term 14 years. H. F. Stansbury and J. F. Davis, Scranton, Pa.

54,153. Tire casing. Patented November 4, 1919. Term 14 years. O. L. Weaver, assignor to The Star Rubber Co.—both of Akron, O.

54,185. Tire tread. Patented November 11, 1919. Term 14 years. C. A. Swinehart, assignor to The Victor Rubbber Co.—both of Springfield, O.

54,186. Tire tread. Patented November 11, 1919. Term 14 years. R. H. Syfers, Indianapolis, Ind.

54,193. Non-skid tire. Patented November 18, 1919. Term 14 years. P. I. Anderson, assignor to The Black Hawk Tire & Rubber Co.—both of Des Moines, Ia.

THE DOMINION OF CANADA.

4,665. Rubber heel. Patented October 22, 1919. R. S. Smart, Ottawa, Ont.

FEE FOR TEMPORARY FILING OF TRADE-MARKS AND PATENTS IN CHINA.

In accordance with instructions from the inspector-general of Chinese customs, a fee of Haikwan taels 5.00 will, from August 1, 1919, be charged for each trade-mark or patent filed for provisional registration at the branch office of the trade-marks bureau at Shanghai.

When fees are remitted by persons living in foreign countries, Mexican $7.50 will be accepted as the equivalent of Haikwan taels 5.00. This fee will be payable until the regulations for the registration of trade-marks and patents come into force, when it will be subject to whatever modification the said regulations may prescribe.

Application for registration at Shanghai must still be made through the American consulate-general, and, to avoid delay and exchange complications, should, in every case, be accompanied by a remittance of Mexican $7.50, payable to the commissioner of customs, Shanghai.—"The Official Gazette."

COTTON NOTES.

SUCCESSFUL PLANTING IN BELGIAN CONGO.

THE SYSTEMATIC ENDEAVOR to introduce the cultivation of cotton into the Belgian Congo seems to have succeeded. In 1912 the matter was put in charge of an American cotton specialist named Fisher, whose first experiments in the Lower Congo region failed because of irregular rains. In 1915 Nyangwe, a region in Manyema, where the climate is more settled and rain is more abundant, was planted to the extent of 55 acres, which were increased to about 3,600 acres by 1919.

Satisfactory results were also obtained in the Sankurke and Kassai regions, where about as many more acres are under cultivation, which means a yield of 600 or 700 tons of cotton. The Welle region, where the climate is suitable and the natives are industrious, will be tried next. American ginning machinery has been imported and has been set up at Kibombo and Lusambo, the collecting points. The Congo cotton sold in Liverpool has been graded as middling and good middling. The first lots of Congo cotton that reached Antwerp after the armistice sold well; the latest cargo brought 5,900 piculs, or $11.40 a ton.

COLOMBIA COTTON.

Cotton raising is neglected in Colombia, although what is grown under unfavorable circumstances is very fine, and of long staple. It is planted without previous preparation of the soil except cutting down and burning off the brush; weeds are chopped out with machetes. It needs to be replanted only once in five years and the yield is about 400 pounds an acre the first year and 800 pounds an acre after that.

In 1914 Colombian cotton sold for 24 cents in Liverpool; the output was 789,390 pounds. In 1917 Colombian cotton worth $23,777 was shipped to the United States. At present not enough is raised to supply the local demand and cotton has to be imported.

COTTON SINCE THE WAR.

Comparisons between the cotton crop of the United States in 1914 and in 1918, show a decline in acreage and production but an increase in value. In 1914 the number of acres planted was 36,832,000, which produced 16,135,000 bales of cotton, valued on the plantation at $549,036,000; in 1918 the acres were 35,890,000, bearing 11,700,000 bales, valued at $1,616,207,000. The price of cotton at the plantation on December 1 was 6.8 cents per pound in 1914; in 1918 it was 27.6 cents per pound.

EGYPTIAN COTTON CROP 1919-1920.

The Egyptian cotton crop for 1919-1920 is estimated at 6,000,000 cantars of 99 pounds, or 5,940,000 pounds, according to Consul Garrels of Alexandria. The crop for the financial year ended August 31, 1919, was 5,927,460 cantars, of which 443,000 cantars remained on hand on that date. The exports, in Egyptian bales of 750 pounds, amounted to 718,309 bales, of which 459,744 bales went to England, 95,262 to the United States, 78,487 to France, 49,328 to Italy, 22,160 to Japan, 10,436 to Spain, 2,602 to Greece and Syria, 250 to Portugal and 10 bales to the Dutch East Indies.

Review of the Crude Rubber Market.

NEW YORK.

THE CRUDE RUBBER MARKET has shown a slow but steady advance throughout the month and was very firm in the last week of December so that the year ends with prices at the highest point they have shown in some months. While the demand continues, the steadiness is due in large part to the firm handling of the Singapore and London markets. The excessive stock in the East, if it existed, has not been poured upon the market; the American demand, which was put at 300,000 tons or more, will be met by the importation of not more than 250,000 tons for 1919.

Prices for plantation and South American rubber at the beginning and toward the close of the month are shown in the following quotations:

PLANTATIONS. DECEMBER 2, first latex crêpe, spot 53 cents, futures 53@53¼ cents. DECEMBER 31, spot 54¾@55 cents, futures 55 cents. JULY-DECEMBER, 55¼ cents.

DECEMBER 2, Ribbed smoked sheets, spot, 52½@53 cents, futures 52½@53 cents. DECEMBER 31, spot 54¾@55 cents, futures 54¾@55 cents.

DECEMBER 2, No. 1 amber crêpe, spot 51 cents, futures 51 cents. DECEMBER 31, spot 53@53½ cents, futures 53@53½ cents.

DECEMBER 2, clear thin brown crêpe, spot 47 cents, futures 47½ cents. DECEMBER 31, spot 48¾@49 cents, futures 48¾@49 cents.

DECEMBER 2, No. 1 roll brown crêpe, spot 42½@43 cents, futures 42½ cents. DECEMBER 31, spot, 43½ cents, futures 42½ cents.

SOUTH AMERICAN PARÁS AND CAUCHO. DECEMBER 2, spot prices upriver fine 49 cents, islands fine 48 cents, upriver coarse 36 cents, islands coarse 22 cents, Cametá coarse 22@23 cents, Caucho ball 35 cents. DECEMBER 31, upriver fine 49 cents, islands fine 46¾ cents, upriver coarse 36½ cents, islands coarse 22 cents, Cametá coarse 23½ cents, caucho ball 35½ cents.

NEW YORK QUOTATIONS.

Following are the New York spot quotations, for one year ago, one month ago and on December 31, the current date:

	January 1, 1919.	December 1, 1919.	December 31, 1919.
PLANTATION HEVEA—			
First latex crêpe	$0.54 @	$0.52¼ @	$0.55 @
Amber crêpe No. 1	.48 @	.51 @	.53 @
Amber crêpe No. 2	.47 @	.50 @	.52 @
Amber crêpe No. 3	.46 @	.49 @	.51 @
Amber crêpe No. 4	.45 @	.47 @	.49 @
Brown crêpe, thick and thin clean	.45 @	.47 @	.49 @
Brown crêpe, thin specky	.40 @	.45 @	.45 @
Brown crêpe, rolled	.35 @	.43 @	.43½ @
Smoked sheet, ribbed, standard quality	.52 @	.57¼ @	.55 @
Smoked sheets, plain, standard quality	.51 @	.54 @	.50 @
Unsmoked sheet, standard quality	.49 @	.52 @	.48 @
Colombo scrap No. 1	.38 @	.35 @	.38 @
Colombo scrap No. 2	.36 @	.34 @	.36 @
EAST INDIAN—			
Assam crêpe	.36 @.37	.49 @	.49 @.50
Assam onions	.44 @.45	.47 @	@
Penang block scrap	.38 @.42	@	.38½ @
PONTIANAK—			
Banjermassin	.14½ @	.11½ @.14	.13 @
Palembang	.14¾ @	.13 @	.14 @
Pressed block	.18½ @	.24 @.27	.24 @
Sarawak	@	11 @	.12 @
SOUTH AMERICAN—			
PARÁS—			
Upriver fine	.61 @	.49 @.50	.50 @
Upriver medium	.55 @	@	@
Upriver coarse	.35½ @	.36 @	.37 @
Upriver weak, fine	.51 @	.40 @	.40 @
Islands, fine	.52 @	.47½ @.48	.47 @
Islands, medium	.45 @	.47 @.48	.47 @.48
Islands, coarse	.23½ @	.22 @.23	.22 @
SOUTH AMERICAN—			
PARÁS—			
Cametá, coarse	.24 @	.22 @	.24 @.25
Madeira, fine	.56 @	.51 @.51½	.51 @.52
Acre Bolivian, fine	.56 @	.51 @.51½	.51 @.52
Peruvian fine	.55 @	.50 @	.51 @.52
Tapajos fine	@	.50 @	.50 @
CAUCHO—			
Lower caucho ball	.34 @	.32 @.34	.29½ @
Upper caucho ball	.35 @	.34 @.35	.34½ @
MANIÇOBAS—			
Ceara negro heads	.35 @	@	@
Ceara scrap	.35 @	@	@
Maniçoba (30% guarantee)	@	@	@
Mangabeira thin sheet	@	@	@
CENTRALS—			
Corinto scrap	.37 @	.34 @.34½	.34½ @.35
Esmeralda sausage	.36 @.36½	.34 @.34½	.34½ @.35
Central scrap	.35½ @.36	.33 ¾	.34 @
Central scrap and strip	.33 @.35½	.32 @.32½	.32 @.33
Central wet sheet	@	.22 @.23	.23 @
Guayule (20% guarantee)	.26 @.27	.28 @	.28 @
Guayule, washed and dried	@	.38 @	.38 @
	@	@	@
AFRICANS—			
Niger flake, prime	.28 @	.18 @	.18 @
Benguela, extra No. 1, 28%	.33 @	@	@
Benguela No. 2, 32½%	.29 @	@	@
Congo prime, black upper	.48 @	.37 @	.37 @
Congo prime, red upper	.48 @	@	@
Kassai black	.48 @	.37 @.38	.37 @
Rio Nunez ball	.55 @	@	@
Rio Nunez sheets and strings	@	.42 @	.40 @
Conakry niggers	.51 @	.42 @	.40 @
Massai sheets and strings	@	.42 @	.40 @
GUTTA PERCHA—			
Gutta Siak	.23 @.24	.25 @	.27½ @
Red Macassar	2.90 @2.95	2.85 @	2.60 @
BALATA—			
Block, Ciudad, Bolivar	.69 @.70	.60 @.64	.59 @
Colombia	.58 @.59	.53 @.55	.53 @
Panama	.57 @.58	.43 @.45	.45 @
Surinam sheet	@	.88 @	.86 @
amber	@	.90 @	.90 @

RECLAIMED RUBBER.

There has been only moderate activity in the reclaimed rubber market during December. Prices are firm with upward tendency, and reclaimers are anticipating renewed activity following the first of the year inventory period.

NEW YORK QUOTATIONS.

DECEMBER 29, 1919.
Prices subject to change without notice.

Standard reclaims:	
Floating	.30 @ .35
Friction	.25 @ .35
Mechanical	.11½ @ .12½
Red	.11½ @ .12½
Shoe	.15¼ @ .15¾
Tires, auto	.15¾ @ .17
truck	.12 @ .13
White	.22 @ .25

COMPARATIVE HIGH AND LOW SPOT RUBBER PRICES.

	November.					
	1919.*		1918.		1917.	
PLANTATIONS:			Allocated and Free.			
First latex crêpe	$0.54½ @	.53	$0.63 @	.41	$0.64 @	.57
Smoked sheet ribbed	.54 @	.52	.61½ @	.46	.62 @	.55½
PARAS:						
Upriver, fine	.52 @	.49	.68 @	.57½	.63 @	.55
Upriver, coarse	.35 @	.34½	.40 @	.31	.44½ @	.47
Islands, fine	.48½ @	.48	.59 @	.44	.49 @	.45
Islands, coarse	.23½ @	.21½	.27 @	.21½	.27¼ @	.25
Cametá	.23 @	.23	.28 @	.21	.27½ @	.25

*Figured only to November 28, 1919.

	December.					
	1919.*		1918.		1917.	
PLANTATIONS:			Allocated and Free.			
First latex crêpe	$0.55 @	$0.51	$0.58 @	$0.54	$0.59 @	$0.52¼
Smoked sheet ribbed	.55 @	.51	.56 @	.52	.58 @	.50
PARAS:						
Upriver fine	.49 @	.47	.66 @	.62	.62 @	.57
Upriver coarse	.36½ @	.35	39½ @	.36½	.42 @	.37
Islands fine	.48¼ @	.46¾	.57 @	.53	.51 @	.47
Islands, course	.22 @	.21	.25 @	.24¼	.26¼ @	.24½
Cametá	.23½ @	.23	.26 @	.25	.26½ @	.24½

*Figured to December 31, 1919.

THE MARKET FOR COMMERCIAL PAPER.

In regard to the financial situation, Albert B. Beers, broker in crude rubber and commercial paper, No. 68 William street, New York City, advises as follows:

"The demand for commercial paper during December has been very limited, and almost entirely from out-of-town banks, the best rubber names being taken at 6 per cent to 6¼ per cent, and those not so well known 6½ per cent, rates being very firm the last half of the month."

SINGAPORE RUBBER REPORT.

GUTHRIE & CO., LIMITED, Singapore, report [November 6, 1919]:

The usual weekly rubber auctions which opened on Wednesday were marked by a good demand for all grades which continued throughout the sales. Fine pale crêpe sold at up to 97 cents, showing an advance on last week of 1½ cents. Ribbed smoked sheet realized up to 97½ cents or 1 cent better than last auction.

The principal feature of the sales was the demand for lower grades (particularly fine brown crêpe) which were 2½ to 5 cents-up on the week.

Out of 1,072 tons catalogd 918 tons were offered and 683 tons sold.

The following is the course of values:

	In Singapore, per Pound.[1]			Sterling Equivalent per Pound in London.		
Sheet, fine ribbed smoked	94c	@	97½c	2/ 4¾	@	2/ 5¾
Sheet, good ribbed smoked	8/	@	93½	2/ 2⅞	@	2/ 4½
Crêpe, fine pale	95½	@	97	2/ 5¾	@	2/ 6⅛
Crêpe, good pale	86½	@	93	2/ 3⅛	@	2/ 5
Crêpe, fine brown	75	@	83	2/	@	2/ 2¼
Crêpe, good brown	69	@	75	1/10¼	@	2/
Crêpe, dark	64	@	71	1/ 8⅞	@	1/10¼
Crêpe, bark	61	@	65½	1/ 8	@	1/ 9¼

[1]Quoted in S. S. Currency—$1 = $0.567.

FEDERATED MALAY STATES RUBBER EXPORTS.

It is reported by official report from Kuala Lumpur states that the exports of plantation rubber from the Federated Malay States in the month of October amounted to 8,381 tons, compared with 9,841 tons in September and 5,901 tons in the corresponding month of last year. The total exports for ten months of the present year were 88,205 tons, against 64,043 tons in 1918 and 65,927 tons in 1917. Appended are the comparative statistics:

	1917.	1918.	1919.
January ...tons	5,995	7,588	7,163
Februarv	7,250	6,820	10,809
March	7,088	7,709	10,679
April	5,955	7,428	7,664
May	7,179	5,851	7,308
June	6,009	5,161	7,094
July	5,798	5,706	8,640
August	6,487	5,291	10,626
September	7,087	6,588	9,841
October	7,079	5,901	8,381
Totals	65,927	64,043	88,205

STRAITS SETTLEMENTS RUBBER EXPORTS.

An official report from Singapore states that the export of plantation rubber from the Strait Settlement ports in the month of October as 8,338 tons as against 10,476 tons in September and 3,260 tons in the corresponding month last year. The total exports for ten months of the present year aggregate 118,290 tons, compared with 54,876 tons in 1918 and 61,034 tons for the corresponding period in 1917. Appended are the comparative statistics:

	1917.	1918.	1919.
January ...tons	3,562	4,302	14,404
February	6,495	2,334	15,661
March	8,299	8,858	20,908
April	6,103	6,584	10,848
May	6,282	13,587	15,845
June	8,775	6,515	5,059
July	7,351	1,978	7,818
August	3,786	1,249	8,933
September	5,679	6,209	10,476
October	4,702	3,260	8,338
Totals	61,034	54,876	118,290

(Transhipments amounted to 832 tons.)

BATAVIA RUBBER MARKET.

HERMANS, MARSMAN & CO., Batavia, report [September 18-October 15, 1919]:

The market opened with small demand for first crêpe and smoked sheets and more demand for the lower grades. During the month under review the tone of the market was rather steady, although only a little business was done. The market closed firm with a fair demand for all grades, especially for prompt deliveries. The quotations are:

	In Batavia Per ½-kilo.[1] Guilders.	Equivalent Per ½-kilo in U. S. Currency.
Fine pale crêpe	1.33	$0.532
First pale crêpe	1.32	0.528
Prime smoked sheets	1.32½	0.530

[1]Quoted per ½-kilo (1.1 pounds) in Dutch Indian guilders ($0.40).

ANTWERP RUBBER MARKET.

GRISAR & CO., Antwerp, report [December 12, 1919]:

The market for the past three weeks has been very steady, with slightly rising prices. Dealings have been larger and the African rubbers, which had been neglected hitherto, are again attracting serious interest. The sales last week amounted to 224 tons, and the stock on hand in the port of Antwerp was about 925 tons. Some of the prices obtained were: Congo Kassai red 3.90 francs to 5.50 francs per kilogram, according to quality; upper Congo Kutanga, 5 francs; upper Congo ordinary red, 4.80 francs; upper Congo ordinary black, 6 francs; upper Congo équateur, 5.25 francs. The Congo plantation *Hevea* rubber fetched 9.70 francs for smoked sheets, and 9.10 for biscuits.

AMSTERDAM MARKET REPORT.

JOOSTEN & JANSSEN, Amsterdam, report [December 12, 1919]:

The still decreasing rate of exchange of the £ had an unfavorable influence on the market and the tendency was consequently dull and very quiet.

During this week the turnover and demand were small, and through the London market closed somewhat firmer, this has not affected the Amsterdam quotations, and buyers are not inclined to pay more than f. l. 35 for spot standard crêpe.

The turnover on the terminal market was very small.

EXPORTS OF CRUDE RUBBER FROM BELAWAN (DELI), SUMATRA.

	August.		Eight Months Ended August 31.	
	1918.	1919.	1918.	1919.
To Netherlands—*pounds*	.....	1,239,646	.....	2,123,698
United Kingdom	400,531	538,281	3,067,036	6,862,747
Italy	.....	.....	.....	134,080
United States	47,313	2,920,774	6,211,529	11,833,719
Canada	.....	.....	132,328	.....
British India	.....	.....	.....	330,756
Japan	.....	.....	.....	2,160
Australia	.....	.....	.....	405,514
Singapore	1,127,926	1,507,283	10,966,028	15,168,483
Penang	10,329	98,019	317,654	.....
Totals, pounds	1,586,098	6,083,602	21,236,221	37,054,966

PLANTATION RUBBER EXPORTS FROM JAVA.

	September.		Nine Months Ended September 30.	
	1918.	1919.	1918.	1919
To Holland—*kilos*	.....	582,000	.....	1,563,000
England	.....	905,000	1,659,000	5,686,000
France	.....	39,000	.....	215,000
United States	200,000	1,832,000	4,654,000	13,410,000
Australia	.....	.....	354,000	245,000
Singapore	611,000	384,000	6,485,000	3,964,000
Japan	11,000	1,000	667,000	180,000
Other countries	.....	126,000	393,000	159,000
Totals	822,000	3,869,000	14,212,000	25,422,000
Ports of origin:				
Tandjong Priok	326,000	1,614,000	7,507,000	13,314,000
Samarang	.....	85,000	125,000	430,000
Soerabaya	264,000	2,121,000	6,349,000	10,872,000
Totals	590,000	3,820,000	13,981,000	24,616,000

EXPORTS OF INDIA RUBBER FROM PARA, MANAOS AND IQUITOS DURING THE MONTH OF SEPTEMBER, 1919.

EXPORTERS.	NEW YORK. Fine.	Medium.	Coarse.	Caucho.	Totals.	EUROPE. Fine.	Medium.	Coarse.	Caucho.	Total.	Grand Totals.
Stowell & Co.....*kilos*	119,679	12,422	20,617	51,238	203,956	.....	.....	.....	.....	.....	203,956
J. Marques	139,212	21,387	140,365	67,264	368,228	35,180	.....	.....	.....	35,180	403,408
Chamié & Koury Co., Limited	135,141	14,104	30,643	152,400	332,288	.....	.....	.....	.....	.....	332,288
General Rubber Co.	145,973	8,611	53,400	3,754	211,738	11,220	510	.....	.....	11,730	223,463
Suarez, Filho & Co.	214,408	.....	.....	.....	214,408	.....	.....	.....	.....	.....	214,408
Alfredo Valle & Co.	91,049	17,732	36,690	4,950	150,421	.....	.....	.....	51,150	51,150	201,571
Berringer & Co.	97,056	2,901	7,947	64,291	172,195	.....	.....	.....	.....	.....	172,195
Ferreira, Costa & Co.	.....	.....	660	64,480	65,140	.....	.....	.....	.....	.....	65,140
Bitar Irmãos	15,511	1,275	26,857	20,827	.....	.....	.....	.....	.....	.....	65,140
Sundries	26,885	4,053	9,420	151,392	191,750	19,417	1,093	544	.....	21,054	212,804
From Pará	984,914	82,485	326,599	580,596	1,974,594	65,817	1,603	544	51,150	119,114	2,093,708
From Manãos	595,121	113,710	233,200	575,200	1,517,701	73,570	.....	2,573	.....	76,143	1,593,844
From Iquitos	17,762	.....	969	3,082	21,813	37,854	791	7,032	11,621	57,298	79,111
Totals	1,597,797	196,195	560,768	1,159,348	3,514,108	177,241	2,394	10,149	62,771	252,555	3,766,663

(Compiled by Stowell & Co., Pará, Brasil.)

ANTWERP RUBBER ARRIVALS.

DECEMBER 3. By the steamer *Albertville* from the Congo.

Bungé & Co. (Grands Lacs)	*kilos*	5,482
Bungé & Co. (Belgika)		21,858
Bungé & Co. (Comptoir Commercial Congolais)		1,959
Bungé & Co.		1,004
Bungé & Co.		3,475
Société Coloniale Anversoise (S. A. B.)		6,436
Others		22,050
Total	*kilos*	62,264

CRUDE RUBBER ARRIVALS AT NEW YORK AS STATED BY SHIPS' MANIFESTS.

PARAS AND CAUCHO AT NEW YORK.

Pounds.

	Fine.	Medium.	Coarse.	Caucho.	Mixed Rubber.	Totals. Pounds.
NOVEMBER 18. By the S. S. *Byron*, from Rio de Janeiro, Santos and Pará.						
Rodney D. Chipp						28,911
Neuss, Hesslein & Co.				6,779		62,799
F. R. Henderson & Co.				137,500		20,600
G. Amsinck & Co., Inc.						43,685
William Schall & Co.						33,450
Poel & Kelly						122,847
Gaston, Williams & Wigmore						57,304
H. A. Astlett & Co.	13,600		7,000			20,600
Paul Bertuch	89,485					89,485
Various						246,605
NOVEMBER 20. By the S. S. *Manco*, from Manaos and Pará.						
Poel & Kelly	241,133	26,000	24,500		17,200	308,833
G. Amsinck & Co., Inc.						208,271
H. A. Aslett & Co.	101,000		113,000	68,500*	12,000	292.000
Hagemeyer & Brun.						26,684
Cowdrey & Co.						11,467
Gaston, Williams & Wigmore						97,725
C. T. Wilson & Co., Inc.						7,295
Lazard Frères						80,185
Paul Bertuch	59,963		41,045	79,631		180,639
Meyer & Brown, Inc.	11,000			28,900		39,900
Various						880,729

* Cametá.

NOVEMBER 23. By the S. S. *Eten*, from Liverpool.

Meyer & Brown, Inc.	220,400

NOVEMBER 26. By the S. S. *Frankmere*, from Santa Lucia and South America.

Various	158,468

DECEMBER 1. By the S. S. *Zingara*, from Pará.

Poel & Kelly	10,169
Aldens' Successors, Inc.	1,133
General Rubber Co.	6,230
H. A. Astlett & Co.	99,800
Various	463,327

DECEMBER 8. By the S. S. *Socrates*, from Pará.

Poel & Kelly						114,365
H. A. Astlett & Co.	8,000			12,500		20,500
Gaston, Williams & Wigmore						43,165
General Rubber Co.						56,070
F. R. Henderson & Co.	42,412	1,705	6,674	35,652		86,443
Various						230,065

DECEMBER 10. By the S. S. *Michael*, from Iquitos, Manáos and Pará.

W. R. Grace & Co.						10,912
H. A. Astlett & Co.	109,000		30,000	17,500		156,500
Meyer & Brown, Inc.	80,626		12,059	109,983		246,400
G. Amsinck & Co, Inc.						80,800
Poel & Kelly						250,201
General Rubber Co.						11,560
Gaston, Williams & Wigmore						121,865
Neuss, Hesslein & Co.						71,596
F. R. Henderson & Co.	43,368		10,110			44,478
Paul Bertuch			24,889			24,889
Ultramares Corp.						38,100
Various						559,926

DECEMBER 12. By the S. S. *Ebro*, from Valparaiso and Mollendo.

F. R. Henderson & Co.	33,600		22,400		56,000

DECEMBER 13. By the S. S. *Salto*, from Buenos Aires and Montevideo.

P. D. Campbell & Co.	5,066

PLANTATIONS.

(*Figured* 180 *pounds to the bale or case.*)

	Shipment from:	Shipped to:	Pounds.	Totals.
NOVEMBER 24. By the S. S. *Edgemont*, at New York.				
Edward Maurer Co., Inc.	London	New York	162,360	
Adolph Hirsch & Co.	London	New York	17,100	
The Goodyear Tire & Rubber Co.	London	Akron	73,800	
Thornett & Fehr	London	New York	28,080	
Raw Products Co.	London	New York	49,320	330,660
NOVEMBER 24. By the S. S. *City of Hankow*, at New York.				
C. C. Trevanion & Co.	Colombo	Seattle	182,340	
L. Littlejohn & Co., Inc.	Colombo	New York	179,200	
Meyer & Brown, Inc.	Colombo	New York	145,600	
The Goodyear Tire & Rubber Co.	Colombo	Akron	180,000	
F. R. Henderson & Co.	Colombo	New York	40,680	
Poel & Kelly	Colombo	New York	184,770	
Aldens' Successors, Inc.	Colombo	New York	9,043	
Fred Stern & Co.	Colombo	New York	67,200	988,833
NOVEMBER 24. By the S. S. *Adristic*, at New York.				
Various	Southampton	New York	10,080	10,080
NOVEMBER 24. By the S. S. *Eten*, at New York.				
L. Littlejohn & Co., Inc.	Liverpool	New York	67,200	
Thos. A. Desmond & Co.	Liverpool	New York	18,720	
Aldens' Successors, Inc.	Liverpool	New York	152,460	
Hood Rubber Co.	Liverpool	Watertown	45,720	
Various	Liverpool	New York	106,200	390,300
NOVEMBER 24. By the S. S. *Yeboshi Maru*, at New York.				
Thornett & Fehr	Colombo	New York	50,400	
Poel & Kelly	Colombo	New York	115,175	
L. Littlepohn & Co., Inc.	Colombo	New York	134,400	
Meyer & Brown, Inc.	Colombo	New York	140,000	
Various	Colombo	New York	13,380	453,355
NOVEMBER 25. By the S. S. *Seekonk*, at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	281,200	
Poel & Kelly	Colombo	New York	267,300	
United States Rubber Export Co.	Colombo	New York	43,200	
George S. Pettinos	Colombo	New York	18,000	
Chas. T. Wilson Co., Inc.	Colombo	New York	39,600	
Various	Colombo	New York	37,980	691,200
NOVEMBER 26. By the S. S. *Edward Luckenbach*, at New York.				
Meyer & Brown, Inc.	Rotterdam	New York	78,400	
Various	Rotterdam	New York	74,700	153,100
NOVEMBER 28. By the S. S. *Samland*, at New York.				
Aldens' Successors, Inc.	Antwerp	New York	59,569	
Poel & Kelly	Antwerp	New York	17,280	
Various	Antwerp	New York	38,531	115,380
DECEMBER 1. By the S. S. *Schiedyk*, at New York.				
L. Littlejohn & Co., Inc.	Soerabaya	New York	168,000	
Java, Holland-American Trading Co.	Samarang	New York	47,700	
Manhattan Rubber Manufacturing Co.	T'jong Priok	New York	64,440	
The Goodyear Tire & Rubber Co.	T'jong Priok	Akron	72,720	
Poel & Kelly	T'jong Priok	New York	165,780	
W. Hammesfahr & Co.	Telok Betong	New York	67,500	
Various	Soerabaya	New York	58,500	
Various	T'jong Priok	New York	120,180	
Various	Padang	New York	7,020	771,840
DECEMBER 1. By the S. S. *Heinan Maru*, at New York.				
L. Littlejohn & Co., Inc.	Colombo	New York	11,200	
Meyer & Brown, Inc.	Colombo	New York	236,320	
C. C. Trevanion & Co.	Colombo	Seattle	37,800	
Chas. T. Wilson Co., Inc.	Colombo	New York	44,640	
Fred Stern & Co.	Colombo	New York	78,400	
Various	Colombo	New York	215,440	623,800
DECEMBER 2. By the S. S. *Kangaroo*, at New York.				
Thornett & Fehr	Colombo	New York	44,820	
C. C. Trevanion & Co.	Colombo	Seattle	40,320	
Chas. T. Wilson Co., Inc.	Colombo	New York	46,260	
Meyer & Brown, Inc.	Colombo	New York	163,520	
L. Littlejohn & Co., Inc.	Colombo	New York	44,800	339,720
DECEMBER 2. By the S. S. *Maasdyk*, at New York.				
Meyer & Brown, Inc.	Rotterdam	New York	134,400	
Pablo Hermanos	Rotterdam	New York	43,560	
L. Littlejohn & Co., Inc.	Rotterdam	New York	44,800	
Aldens' Successors, Inc.	Rotterdam	New York	330,072	
F. R. Henderson & Co.	Rotterdam	New York	70,500	
Various			118,248	741,580
DECEMBER 2. By the S. S. *Valacia*, at New York.				
F. R. Henderson & Co.	Liverpool	New York	139,725	
Hood Rubber Co.	London	Watertown	84,578	
Meyer & Brown	Liverpool	New York	280,000	
Thornett & Fehr	Rotterdam	New York	3,420	
Paterson, Simmons & Co.	Liverpool	New York	97,740	
Aldens' Successors, Inc.	Liverpool	New York	913,602	
T. D. Downing & Co.	Liverpool	New York	36,360	
Poel & Kelly	Liverpool	New York	384,120	
L. Littlejohn & Co., Inc.	Liverpool	New York	828,800	
Various	Rotterdam	New York	160,740	
Various	Liverpool	New York	554,195	3,482,280
DECEMBER 3. By the S. S. *Jacques Cartier*, at New York.				
Poel & Kelly	Havre	New York	59,400	59,400
DECEMBER 3. By the S. S. *Tregenna*, at New York.				
Meyer & Brown, Inc.	Colombo	New York	100,800	
General Rubber Co.	Colombo	New York	97,200	198,000
DECEMBER 3. By the S. S. *Langdon Hall*, at New York.				
Poel & Kelley		New York	156,420	
Thomas J. Lipton, Inc.		New York	84,600	
L. Littlejohn & Co., Inc.		New York	383,200	
United States Rubber Co.		New York	1,260,000	
Various		New York	81,380	1,965,600
DECEMBER 5. By the S. S. *Rimouski*, at New York.				
Poel & Kelly	Liverpool	New York	694,800	
General Rubber Co.	Liverpool	New York	34,920	
The B. F. Goodrich Co.	Liverpool	Akron, Ohio	132,480	
Hood Rubber Co.	Liverpool	Watertown	32,220	
F. R. Henderson & Co.	Liverpool	New York	56,000	
Thornett & Fehr	Liverpool	New York	1,260	
Various	Liverpool	New York	270,180	1,221,860
DECEMBER 6. By the S. S. *Zuiderdyk*, at New York.				
Poel & Kelly	Rotterdam	New York	3,960	
Pablo Hermanos	Rotterdam	New York	2,880	
Meyer & Brown, Inc.	Rotterdam	New York	78,400	
Aldens' Successors, Inc.	Rotterdam	New York	8,861	
Various	Rotterdam	New York	72,900	167,001

	Shipment from:	Shipped to:	Pounds	Total
DECEMBER 8. By the S. S. *Lapland*, at New York.				
W. R. Grace & Co.....	Southampton	New York	28,980	28,980
DECEMBER 8. By the S. S. *Garoet*, at New York.				
Fred Stern & Co.....	Soerabaya	New York	33,600	
Rutger Bleecker	Soerabaya	New York	130,140	
Poel & Kelly.....	Soerabaya	New York	210,240	
The Goodyear Tire & Rubber Co.	Soerabaya	Akron	63,000	
The Goodyear Tire & Rubber Co.	T'jong Priok	Akron	224,100	
L. Littlejohn & Co., Inc.	T'jong Priok	New York	114,500	
General Rubber Co.....	T'jong Priok	New York	502,380	
J. T. Johnstone & Co., Inc.	T'jong Priok	New York	33,120	
Vernon Metal & Produce Co.	T'jong Priok	New York	12,060	
Edward Maurer Co., Inc.	T'jong Priok	New York	27,720	
Chas. T. Wilson, Inc....	T'jong Priok	New York	69,120	
The Fisk Rubber Co....	T'jong Priok	Chicopee Fls.	334,440	
Peninsular Trading Agency, Inc.	T'jong Priok	New York	30,600	
Aldens' Successors, Inc..	T'jong Priok	New York	27,000	
Catz American Co.....	T'jong Priok	New York	70,740	
Rubber Trading Co.....	T'jong Priok	New York	26,880	
Various	T'jong Priok	New York	316,260	2,225,900
DECEMBER 8. By the S. S. *Teenhai*, at New York.				
Fred Stern & Co.....	Singapore	New York	492,800	
L. Littlejohn & Co., Inc.	Singapore	New York	896,000	
L. Littlejohn & Co., Inc.	Penang	New York	89,100	
William H. Stiles & Co..	Singapore	New York	254,160	
William H. Stiles & Co..	Penang	New York	69,300	
Poel & Kelly.....	Singapore	New York	325,440	
Poel & Kelly.....	Deli	New York	18,000	
The B. F. Goodrich Co..	Singapore	Akron	188,820	
The B. F. Goodrich Co..	Penang	Akron	71,460	
Chas. T. Wilson & Co., Inc.	Singapore	New York	56,880	
Hood Rubber Co.....	Deli	Watertown	22,500	
The Goodyear Tire & Rubber Co.	Singapore	Akron	429,920	
The Goodyear Tire & Rubber Co.	Deli	Akron	52,200	
Rubber Importers' & Dealers' Co., Inc.....	Singapore	New York	141,120	
Raw Products Co.....	Singapore	New York	70,240	
J. T. Johnstone & Co., Inc.	Singapore	New York	58,720	
J. T. Johnstone & Co., Inc.	Deli	New York	54,180	
T. A. Desmond & Co..	Singapore	New York	141,120	
Smith & Schipper.....	Singapore	New York	50,400	
Adolf Hirsch & Co.....	Singapore	New York	26,280	
W. G. Ryckman, Inc...	Penang	New York	29,700	
Gaston, Williams & Wigmore	Singapore	New York	37,440	
Aldens' Successors, Inc.	Singapore	New York	22,400	
Hadden & Co.....	Singapore	New York	57,600	
Gove & French.....	Singapore	New York	80,100	
F. R. Henderson & Co., Inc.	Deli	New York	140,130	
Thornett & Fehr.....	Deli	New York	111,700	
Winter, Ross & Co.....	Singapore	New York	50,800	
Meyer & Brown, Inc...	Singapore	New York	246,400	
Swinehart Tire & Rubber Co.	Deli	Akron	59,040	
Balfour, Williamson & Co.	Singapore	New York	76,080	
Boston Insulated Wire & Cable Co.....	Singapore	Dorchester	1,800	
Various	Port Swet'n'm	New York	107,720	
Various	Penang	New York	19,800	
Various	Deli	New York	111,010	
Various	Singapore	New York	42,340	
Various	Zamboango	New York	16,740	4,719,440
DECEMBER 9. By the S. S. *Willaston*, at New York.				
Aldens' Successors, Inc.	London	New York	1,154,931	
Chas. T. Wilson & Co., Inc.	London	New York	1,597,860	
Poel & Kelly.....	London	New York	52,740	
The Goodyear Tire & Rubber Co.	London	Akron	19,800	
Thornett & Fehr.....	London	New York	119,700	
L. Littlejohn & Co., Inc.	London	New York	112,000	
F. R. Henderson & Co..	London	New York	128,000	
Various	London	New York	3,350,991	6,536,022
DECEMBER 10. By the S. S. *Noordam*, at New York.				
Meyer & Brown, Inc....	Rotterdam	New York	33,600	
Fred Stern & Co.....	Rotterdam	New York	4,789	
Pablo Hermanos	Rotterdam	New York	85,680	
Various	Rotterdam	New York	178,709	302,778
DECEMBER 10. By the S. S. *West Wind*, at New York.				
J. T. Johnstone & Co., Inc.	Singapore	New York	162,500	
Aldens' Successors, Inc..	Singapore	New York	92,980	
W. R. Grace & Co.....	Singapore	New York	10,080	
Fred Stern & Co.....	Singapore	New York	212,800	
Edward Boustead & Co..	Penang	New York	97,920	
L. Littlejohn & Co., Inc.	Singapore	New York	1,379,520	
Aldens' Successors, Inc.	Penang	New York	106,560	
Balfour, Williamson & Co.	Singapore	New York	11,520	
Mitsui & Co., Limited...	Singapore	New York	107,280	
Wilson, Holgate & Co...	Singapore	New York	32,400	
Chas. T. Wilson & Co., Inc.	Singapore	New York	215,640	
The Fisk Rubber Co....	Singapore	Chic'p'e Falls	210,780	
Hadden & Co.....	Singapore	New York	52,560	
William H. Stiles & Co..	Singapore	New York	64,800	
F. R. Henderson & Co..	Singapore	New York	1,468,949	
Rubber Importers' & Dealers' Co., Inc.....	Singapore	New York	522,720	
Bright & Galbraith.....	Penang	New York	23,040	
The Goodyear Tire & Rubber Co.	Singapore	Akron	453,420	
The Goodyear Tire & Rubber Co.	Penang	Akron	40,400	
Poel & Kelly.....	Penang	New York	45,540	
Pacific Trading Co.....	Penang	New York	13,500	
Indo-Malay Co.	Penang	New York	53,100	
T. A. Desmond & Co...	Singapore	New York	60,480	
W. G. Ryckman, Inc....	Singapore	New York	57,600	
Meyer & Brown, Inc....	Singapore	New York	336,000	
General Rubber Co.....	Singapore	New York	478,800	
Rogers-Pyatt Shellac Co..	Singapore	New York	96,480	
American Trading Co...	Singapore	New York	34,020	
Edward Maurer & Co., Inc.	Singapore	New York	342,540	
Robertson Co.	Singapore	New York	95,940	
Foreign Trade Banking Corp.	Singapore	New York	91,800	
Various	Singapore	New York	611,180	
Various	Penang	New York	302,109	7,884,958
DECEMBER 12. By the S. S. *Michigan*, at New York.				
Edward Maurer & Co., Inc.	London	New York	246,960	
Thornett & Fair.....	London	New York	478,260	
L. Littlejohn & Co., Inc.	London	New York	56,120	
H. P. Winter & Co.....	London	New York	29,080	
Rubber Trading Co.....	London	New York	58,240	868,660
DECEMBER 16. By the S. S. *Verentia*, at New York.				
Meyer & Brown, Inc...	Liverpool	New York	67,200	
T. D. Downing & Co....	Liverpool	New York	241,880	
Poel & Kelly.....	Liverpool	New York	864,900	
Rubber Trading Co.....	Liverpool	New York	42,560	
L. Littlejohn & Co., Inc.	Liverpool	New York	11,200	
Various	.....	.....	64,080	1,291,820
DECEMBER 18. By the S. S. *City of Benares*, at New York.				
The Goodyear Tire & Rubber Co.	Rangoon	Akron	56,700	
Chas. T. Wilson & Co., Inc.	Rangoon	New York	21,960	
L. Littlejohn & Co., Inc.	Rangoon	New York	211,140	
General Rubber Co.....	Rangoon	New York	226,080	
Rubber Trading Co.....	Singapore	New York	22,400	
Meyer & Brown, Inc....	Colombo	New York	489,400	
Fred Stern & Co.....	Colombo	New York	6,720	
Various	Rangoon	New York	259,880	1,294,280

BALATA.

DECEMBER 1. By the S. S. *Allianca*, at New York.				
Piza, Nephews & Co....	Cristobal	New York	240	240
DECEMBER 1. By the S. S. *Tivives*, at New York.				
G. Amsinck & Co., Inc.	Cristobal	New York	1,800	1,800
DECEMBER 1. By the S. S. *Leviso*, at New York.				
G. Amsinck & Co., Inc.	Cartagena	New York	1,560	1,560
DECEMBER 4. By the S. S. *Colon*, at New York.				
Ultramares Corp.....	Cristobal	New York	2,100	
J. S. Sembrada & Co...	Cristobal	New York	3,450	
Hulbron, Wolf & Co...	Cristobal	New York	1,050	6,600
DECEMBER 5. By the S. S. *Rimoushi*, at New York.				
[1]R. & J. Dick, Limited.	Liverpool	Passaic	30,500	30,500

[1] Figured at 500 pounds to the bale.

DECEMBER 5. By the S. S. *Lake Gilboa*, at New York.				
G. Amsinck & Co., Inc.	Cartagena	New York	6,000	6,000
DECEMBER 6. By the S. S. *Gen. O. H. Ernst*, at New York.				
American Trading Co..	Cristobal	New York	5,100	
H. Marquardt & Co....	Cristobal	New York	10,050	
G. Amsinck & Co., Inc.	Cristobal	New York	3,750	18,900
DECEMBER 8. By the S. S. *Prins Frederich Hendrick*, at New York.				
Wm. Schall & Co.....	Paramaribo	New York	8,700	
Arkell & Douglas, Inc..	Paramaribo	New York	12,000	20,700
DECEMBER 15. By the S. S. *Berenice*, at New York.				
Arkell & Douglas, Inc..	Paramaribo	New York	6,600	
William Schall & Co...	Paramaribo	New York	24,310	
Middleton & Co.....	Demerara	New York	90,500	
J. P. Watson.....	Demerara	New York	20,000	
Various	Demerara	New York	22,000	163,410
DECEMBER 16. By the S. S. *Gen. W. C. Gorgas*, at New York.				
M. A. De Leon & Co..	Cristobal	New York	3,600	3,600

CENTRALS.

NOVEMBER 29. By the S. S. *Caracas*, at New York.				
Scholtz & Co.....	Venezuela	New York	8,300	
Yglesias & Co.....	Venezuela	New York	700	9,000
DECEMBER 1. By the S. S. *Leviso*, at New York.				
Ultramares Corp.	Cartagena	New York	13,800	
G. Amsinck & Co., Inc..	Cartagena	New York	300	14,100

DECEMBER 4. By the S. S. *Colon*, at New York.

Hetilbron, Wolf & Co...	Cristobal	New York	1,000	
Ultramares Corp.	Cristobal	New York	4,000	
G. Amsinck & Co., Inc.	Cristobal	New York	7,200	
Pablo Calvet & Co.....	Cristobal	New York	27,800	
Balfour, Williamson & Co.	Cristobal	New York	5,000	
J. S. Sembrada & Co....	Cristobal	New York	20,000	
Various	Cristobal	New York	1,100	66,100

DECEMBER 5. By the S. S. *Abangarez*, at New York.

R. del Castello.....	Cristobal	New York	1,100	1,100

DECEMBER 5. By the S. S. *Lake Gilboa*, at New York.

G. Amsinck & Co., Inc..	Cartagena	New York	100	100

DECEMBER 8. By the S. S. *San Jacinto*, at New York.

Border Rubber Co.....	Havana	New York	8,100	8,100

DECEMBER 16. By the S. S. *Gen. W. C. Gorgas*, at New York.

G. Amsinck & Co., Inc..	Cristobal	New York	3,120	
William Schall & Co....	Cristobal	New York	3,240	
Colombo Overseas Corp..	Cristobal	New York	15,720	
Various	Cristobal	New York	120	22,200

MANICOBA.

DECEMBER 1. By the S. S. *Zingara*, at New York.

G. Amsinck & Co., Inc..	Para	New York	7,392	7,392

PONTIANAK.

DECEMBER 8. By the S. S. *Teenkai*, at New York.

Meyer & Brown, Inc...	Singapore	New York	120,600	
Kidder, Peabody & Co..	Singapore	Boston	12,000	132,600

DECEMBER 10. By the S. S. *West Wind*, at New York.

L. Littlejohn & Co., Inc.	Singapore	New York	231,300	
Fred. Stern & Co.....	Singapore	New York	65,700	
United Malaysian Co., Ltd.	Singapore	New York	345,300	
Otto Gross	Singapore	New York	1,200	643,500

AFRICANS.

NOVEMBER 23. By the S. S. *Eton*, at New York.

Various	Liverpool	New York	11,300	11,300

NOVEMBER 26. By the S. S. *Boutry*, at New York.

Niger Co., Ltd.....	Dakar	New York	690	
Alexander Roberts & Co.	Dakar	New York	44,000	44,690

DECEMBER 1. By the S. S. *Hatteras*.

Various	Marseilles	New York	8,645	8,645

DECEMBER 1. By the S. S. *Swazi*, at New York.

Henderson & Sons.....	Hull	New York	1,955	1,955

DECEMBER 1. By the S. S. *Saint André*, at New York.

Huth & Co.....	Bordeaux	New York	385,480	
Fred. Stern & Co.....	Bordeaux	New York	27,127	
Rubber Trading Co.....	Bordeaux	New York	51,520	
Various	Bordeaux	New York	110,607	574,734

GUTTA PERCHA.

NOVEMBER 26. By the S. S. *Boutry*, at New York.

Niger Co., Ltd.....	Dakar	New York	9,300	9,300

GUTTA SIAK.

DECEMBER 8. By the S. S. *Teenkai*, at New York.

L. Littlejohn & Co, Inc.	Singapore	New York	8,400	8,400

DECEMBER 10. By the S. S. *West Wind*, at New York.

L. Littlejohn & Co, Inc.	Singapore	New York	127,500	127,500

GUTTAS.

DECEMBER 10. By the S. S. *West Wind*, at New York.

United Malaysian Co., Ltd.	Singapore	New York	84,000	84,000

CRUDE RUBBER ARRIVALS AT PACIFIC PORTS AS REPORTED.

PLANTATIONS.

(Figured 180 pounds net to the bale or case.)

	Shipment from:	Arrived at:	Shipped to:	Pounds.	Totals.
NOVEMBER 24. By the S. S. *Shinyo Maru*.					
Rubber Trading Co..	Singapore	San Fran.	New York	22,400	
F. R. Henderson & Co.	Singapore	San Fran.	New York	355,575	377,975
DECEMBER 3. By the S. S. *Protesilaus*.					
Fred. Stern & Co....	Singapore	Seattle	Seattle	281,000	
F. R. Henderson & Co.	Singapore	Seattle	New York	802,932	1,083,932
DECEMBER 5. By the S. S. *West Sequana*.					
F. R. Henderson & Co.	Singapore	San Fran.	New York	80,500	
Rubber Trading Co..	Singapore	San Fran.	New York	33,600	114,100
DECEMBER 10. By the S. S. *Empress of Japan*.					
E. Boustead & Co...	Penang	Vancouver	New York	72,900	72,900
DECEMBER 12. By the S. S. *Seiyo Maru*.					
F. R. Henderson & Co.	Singapore	San Fran.	New York	75,400	75,400
DECEMBER 12. By the S. S. *Wheatland Montana*.					
Fred. Stern & Co...	Kobe	Seattle	Seattle	22,400	22,400

OFFICIAL INDIA RUBBER STATISTICS FOR THE UNITED STATES.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	October. 1918. Pounds.	1918. Value.	1919. Pounds.	1919. Value.
UNMANUFACTURED—*free*:				
India rubber:				
From France	.....	.....	903,765	$277,812
Netherlands	.....	.....	424,224	202,338
Portugal	.....	.....	.....	.....
United Kingdom ..	5,606	$1,732	8,813,978	4,345,532
Canada	496,308	202,027	66,374	27,179
Central America ...	16,655	7,645	23,065	7,654
Mexico	269,884	107,913	8,216	2,417
Brazil	2,253,060	813,208	2,941,514	1,302,557
Peru	9,520	2,285	68,988	19,576
Other South America	66,007	25,630	247,132	91,643
British East Indies..	9,970,526	3,927,055	23,773,158	9,702,603
Dutch East Indies..	1,325,809	537,770	5,819,796	2,470,701
Other countries	808,336	311,201	636,165	279,639
Totals	15,221,711	$5,936,466	43,726,375	$18,729,651
Balata	99,718	$46,430	148,528	$84,588
Guayule	18,000	3,060	179,639	31,213
Jelutong (Pontianak)	21,272	1,906	2,530,053	381,577
Gutta-percha	506,336	94,093	769,115	127,322
Totals	645,326	$145,489	3,627,335	$624,700
Rubber scrap	520,784	28,767	1,235,953	82,903
Totals, unmanufactured.	16,387,821	$6,110,722	48,589,663	$19,437,254
Chicle (dutiable)	450,840	$266,556	960,482	$652,987
MANUFACTURED—*dutiable*:				
India rubber and gutta-percha	.....	$24,462	.....	$54,951
India rubber substitutes....	44,800	6,828	.....	.....

EXPORTS OF DOMESTIC MERCHANDISE.

MANUFACTURED—				
Automobile tires[1]	.....	$930,204	.....	$2,488,299
All other tires[1].....	.....	29,661	.....	147,373
Scrap and old.....	336,961	35,448	854,635	73,052
Reclaimed	238,325	41,130	607,472	105,831
Belting, hose and packing[1]..	.....	404,223	.....	400,553
Suspenders and garters.....	.....	80,400	.....	202,814
Boots[1] .....*pairs*	97,163	402,830	29,045	67,203
Shoes[1] .....*pairs*	254,427	218,802	587,953	490,094
Druggists' rubber sundries[1]..	.....	52,492	.....	117,373
Insulated wire and cables[1]..	.....	525,031	.....	487,444
Other rubber manufactures[1].	.....	441,634	.....	769,396
Totals, manufactured..	.....	$3,161,855	.....	$5,349,432
Fountain pens .....*number*	7,318	4,309	34,806	41,885

EXPORTS OF FOREIGN MERCHANDISE.

UNMANUFACTURED—				
India rubber	97,974	$41,086	637,640	$266,475
Balata	114,972	63,633	5,300	3,366
Guayule	.....	.....	4	1
Jelutong (Pontianak)	623	62	.....	.....
Gutta percha	.....	.....	2,450	1,432
Rubber scrap	.....	.....	548	14
Totals, unmanufactured	213,569	$104,781	645,942	$271,288
MANUFACTURED—				
India rubber	.....	.....	.....	.....
Gutta percha	.....	$6,428	.....	$19,842
Totals, manufactured..	.....	$6,428	.....	$19,842
Chicle	.....	.....	2,277	$1,480

EXPORTS OF RUBBER GOODS TO NON-CONTIGUOUS TERRITORIES OF THE UNITED STATES.

MANUFACTURED—				
To Alaska:				
Belting, hose and packing	.....	$11,417	.....	$5,334
Boots and shoes....*pairs*	7,064	14,360	5,297	77,788
Other rubber goods....	.....	3,305	.....	5,714
Totals	.....	$29,082	.....	$22,846
To Hawaii:				
Belting, hose and packing	.....	$4,340	.....	$5,324
Automobile tires	.....	79,842	.....	29,235
Other tires	.....	319	.....	.....
Other rubber goods.....	.....	11,481	.....	5,502
Totals	.....	$95,982	.....	$40,061
To Porto Rico:				
Belting, hose and packing	.....	$10,443	.....	$7,481
Automobile tires	.....	222,173	.....	77,236
Other tires	.....	3,581	.....	13,130
Other rubber goods.....	.....	13,321	.....	23,562
Totals	.....	$249,518	.....	$121,409
To Philippine Islands:				
Belting, hose and packing	.....	$6,073	.....	$9,103
Boots and shoes....*pairs*	59,432	46,803	14,997	15,693
Tires	.....	126,451	.....	44,125
Other rubber goods....	.....	24,124	.....	9,625
Totals	.....	$203,453	.....	$78,546

[1] Details of exports of domestic merchandise by countries during October are given on page 262 of this issue.

EXPORTS OF INDIA RUBBER MANUFACTURES AND INSULATED WIRE AND CABLE FROM THE UNITED STATES BY COUNTRIES, DURING THE MONTH OF OCTOBER, 1919.

EXPORTED TO—	Belting Hose and Packing.	Boots.		Shoes.		Druggists' Rubber Sundries.	Tires.		Insulated Wire and Cables.	All Other Manufactures of Rubber.	Totals
EUROPE:	Value.	Pairs.	Value.	Pairs.	Value.	Value.	Automobiles. Value.	All Others. Value.	Value	Value	Value.
Austria-Hungary	$5,700	.....	.....	.....	.....	.....	$23,929	$94	$4,016	.....	$33,739
Belgium	550	.....	.....	14,231	8,684	$109	89,907	35,457	4,443	$24,821	163,971
Denmark	6,792	6,468	$12,097	54,324	42,434	3,596	239,096	6,003	3,050	11,048	324,116
Finland	.....	.....	.....	3,480	3,033	300	.....	.....	1,729	.....	5,062
France	1,446	.....	.....	10,031	8,460	7,574	58,362	.....	1,000	80,229	157,071
Germany	.....	.....	.....	1,000	.....	.....	.....	.....	.....	11,465	12,465
Gibraltar	.....	.....	.....	.....	.....	.....	.....	.....	.....	130	130
Greece	.....	.....	.....	.....	.....	.....	2,191	.....	.....	.....	2,191
Iceland and Faroe Islands	.....	1,984	4,662	6,170	3,220	.....	3,309	.....	4,709	636	16,536
Italy	26	.....	.....	8,604	11,304	73	67,400	.....	358	5,974	85,135
Netherlands	10,086	.....	.....	3,744	3,472	432	202,310	20,939	5,621	10,412	253,272
Norway	11,706	48	62	171,056	127,013	1,909	113,182	7,658	67,439	20,472	348,841
Portugal	6,043	.....	.....	1,657	1,604	469	24,918	335	4,041	1,101	38,511
Russia in Europe	.....	.....	.....	38	75	.....	.....	.....	.....	12	87
Spain	3,807	.....	.....	8,236	4,311	2,883	108,494	3,500	2,090	4,323	129,408
Sweden	10,714	.....	.....	6,000	6,000	2,864	273,315	9,759	16,728	28,238	347,618
Switzerland	5,925	.....	.....	27,252	12,229	2,559	89,221	620	162	9,132	119,848
Turkey in Europe	.....	.....	.....	192	200	.....	3,720	1,175	.....	.....	5,095
England	39,828	2,172	3,312	99,125	69,521	21,821	18,998	182	20,703	124,339	298,704
Scotland	7,637	.....	.....	.....	.....	524	.....	.....	300	383	8,844
Ireland	.....	.....	.....	.....	.....	30,061	.....	.....	.....	76	30,137
TOTALS, EUROPE	$109,660	10,672	$20,133	415,140	$302,560	$75,174	$1,318,352	$85,722	$136,389	$332,791	$2,380,781
NORTH AMERICA:											
Bermuda	$130	.....	.....	12	$43	$1,017	.....	135	9	$145	$1,479
British Honduras	31	.....	.....	268	254	194	277	5	8	.....	769
Canada	44,314	5,426	$18,512	8,029	11,771	11	45,399	4,553	19,280	161,820	305,660
Costa Rica	1,593	.....	.....	.....	.....	.....	480	152	396	447	3,068
Guatemala	4,717	.....	.....	120	91	.....	18,885	253	2,799	414	27,159
Honduras	794	.....	.....	.....	.....	.....	1,261	68	112	388	2,623
Nicaragua	970	.....	.....	573	822	.....	2,426	.....	.....	4,604	8,822
Panama	5,592	18	59	645	1,267	501	26,118	540	1,877	7,457	44,411
Salvador	479	.....	.....	.....	.....	82	2,448	.....	250	4,941	8,200
Mexico	56,048	24	149	2,651	2,163	3,809	59,754	3,049	29,048	18,425	172,445
Miquelon, Langley, etc.	.....	113	295	.....	.....	.....	.....	.....	.....	242	537
Newfoundland and Labrador	2,097	4,520	14,608	5,582	6,403	273	1,172	.....	608	4,514	29,675
Barbados	284	.....	.....	.....	.....	1	588	.....	.....	116	989
Jamaica	816	.....	.....	5,807	9,409	57	12,690	91	13	375	23,451
Trinidad and Tobago	650	.....	.....	1,440	1,010	116	11,331	.....	159	632	13,898
Other British West Indies	155	.....	.....	548	420	36	4,251	207	.....	460	5,529
Cuba	55,642	43	208	9,103	8,596	5,998	277,037	13,113	37,331	44,873	441,798
Danish West Indies	177	.....	.....	1	1	21	1,542	.....	.....	302	2,043
Dutch West Indies	193	.....	.....	346	357	31	63	35	.....	167	846
French West Indies	273	2	17	136	177	.....	14,205	.....	85	290	15,047
Haiti	200	.....	.....	.....	.....	.....	2,466	.....	233	322	3,221
Dominican Republic	471	.....	.....	.....	.....	75	2,666	390	563	700	4,865
TOTALS, NORTH AMERICA	$175,626	10,146	$33,848	35,281	$42,784	$12,222	$485,059	$22,591	$92,771	$251,634	$1,116,535
SOUTH AMERICA:											
Argentina	$7,765	.....	.....	12,456	$11,352	$4,840	$156,635	$2,576	$24,365	$24,593	$232,126
Bolivia	343	.....	.....	.....	.....	494	830	.....	2,120	172	3,959
Brazil	13,558	54	193	8,554	7,045	3,189	61,954	494	93,669	53,481	233,583
Chile	6,480	.....	.....	132	152	5,161	33,443	784	13,342	9,694	69,056
Colombia	4,352	1	4	102	63	1,044	12,417	155	1,180	1,146	20,361
Ecuador	.....	.....	.....	96	100	391	4,216	.....	90	916	5,703
British Guiana	394	.....	.....	590	531	.....	425	.....	.....	271	1,621
Peru	14,707	.....	.....	100	185	2,660	9,374	.....	29,078	3,615	59,619
Uruguay	3,677	.....	.....	.....	.....	616	51,787	.....	1,557	7,846	65,483
Venezuela	2,314	.....	.....	.....	.....	2,254	9,584	545	1,669	1,086	17,452
TOTALS, SOUTH AMERICA	$53,590	55	$197	22,030	$19,428	$20,649	$340,665	$4,554	$167,060	$102,820	$708,963
ASIA:											
Aden	.....	.....	.....	.....	.....	.....	$203	.....	.....	.....	$203
China	1,571	1	3	10,558	11,187	1,512	17,920	29	61,625	2,861	96,708
Japanese China	.....	.....	.....	288	894	.....	.....	.....	.....	200	1,094
Chosen	.....	.....	.....	.....	.....	.....	2,144	.....	.....	18	2,162
British India	3,576	.....	.....	.....	.....	1,270	33,799	13,247	2,065	3,741	57,698
Straits Settlements	229	.....	.....	528	428	.....	33,654	.....	.....	815	35,126
Other British East Indies	250	.....	.....	.....	.....	.....	.....	.....	.....	.....	250
Dutch East Indies	1,225	.....	.....	.....	.....	647	70,614	15,314	5,158	4,403	97,361
French East Indies	.....	.....	.....	.....	.....	.....	.....	35	.....	.....	35
Hongkong	.....	24	80	970	1,046	227	2,075	487	.....	614	4,529
Japan	10,637	5,876	7,072	56,255	57,220	.....	11,783	868	3,744	35,122	126,446
Russia in Asia	264	.....	.....	27,192	36,519	1,160	646	.....	46	756	39,391
Siam	.....	.....	.....	3	3	.....	.....	.....	.....	.....	3
Turkey in Asia	.....	.....	.....	1,651	1,001	.....	.....	.....	.....	.....	1,001
TOTALS, ASIA	$17,752	5,901	$7,155	97,445	$108,298	$4,816	$172,838	$29,980	$72,638	$48,530	$462,007
OCEANIA:											
Australia	$5,771	120	$249	2,280	$1,137	$2,321	$24,844	.....	$3,026	$3,049	$40,397
New Zealand	762	1,188	4,112	.....	.....	777	50,912	.....	3,516	9,846	69,925
Other British Oceania	.....	.....	.....	.....	.....	.....	1,012	.....	.....	28	1,040
French Oceania	67	.....	.....	.....	.....	.....	1,179	328	252	25	1,851
German Oceania	.....	8	15	.....	.....	.....	791	26	.....	88	920
Philippine Islands	9,103	204	445	14,793	15,248	392	40,914	3,211	10,868	9,233	89,414
TOTALS, OCEANIA	$15,703	1,520	$4,821	17,073	$16,385	$3,490	$119,652	$3,565	$17,662	$22,269	$203,547
AFRICA:											
British West Africa	.....	1	6	1	$1	$20	$1,355	.....	.....	.....	$1,382
British South Africa	19,394	750	1,043	981	631	982	44,538	790	924	8,402	76,704
Canary Islands	.....	.....	.....	.....	.....	.....	3,073	.....	.....	.....	3,073
French Africa	.....	.....	.....	.....	.....	.....	1,578	.....	.....	10	1,588
Liberia	.....	.....	.....	2	7	.....	13	.....	.....	.....	20
Morocco	.....	.....	.....	.....	.....	.....	225	.....	.....	.....	225
Portuguese Africa	8,828	.....	.....	.....	.....	.....	.....	171	.....	3	9,002
Egypt	.....	.....	.....	.....	.....	20	951	.....	.....	2,937	3,908
TOTALS, AFRICA	$28,222	751	$1,049	984	$639	$1,022	$51,733	$961	924	$11,352	$95,902
TOTALS	$400,553	29,045	$67,203	587,953	$490,094	$117,373	$2,488,299	$147,373	$487,444	$769,396	$4,967,735

SHIPMENTS TO NON-CONTIGUOUS TERRITORY.

EXPORTED TO—	Belting Hose and Packing.	Boots and Shoes. Pairs.	Boots and Shoes. Value.	Druggists' Rubber Sundries. Value.	Tires. Automobiles. Value.	Tires. All Others. Value.	Insulated Wire and Cables. Value	All Other Manufactures of Rubber. Value	Totals Value.
Hawaii	$5,324	1,340	$1,771	.....	$29,235	.....	.....	$5,502	$41,832
Porto Rico	7,481	2,562	2,807	.....	77,236	13,130	.....	23,562	124,216
TOTALS	$12,805	3,902	$4,578	.....	$106,471	$13,130	.....	$29,061	$166,048

(Compiled by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.)

RUBBER STATISTICS FOR ITALY.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Six Months Ended June 30. 1918. Quintals.[1]	1918. Lire.[2]	1919. Quintals.	1919. Lire.
UNMANUFACTURED—				
India rubber and gutta percha—raw and reclaimed:				
From Great Britain	4,279		.....	
India and Ceylon	2,401		18,101	
Straits Settlements	15,727		24,948	
French African Colonies	3,422	37,182,600	2,487	67,274,550
Belgian Congo	61		574	
Brazil	8,249		10,048	
Other countries	1,273		1,013	
Rubber scrap	560	100,800	8,584	1,545,120
Totals, unmanufactured	.....	37,283,400	.....	68,819,670
MANUFACTURED—				
India rubber and gutta percha—Threads	218	566,800	152	395,200
Sheets, including hard rubber	62	100,100	98	161,600
Tubes:				
Inner tubes	4	10,400	2	5,200
Hose	69	89,700	67	87,100
Other forms	1	1,200	19	22,800
Belting	358	301,200	254	355,600
Rubber-coated fabrics—*pieces:*				
For carding combs	96	153,600	284	454,400
Other forms	3	4,500	59	88,500
Boots and shoes—*pairs*	18,056	270,840	12,980	194,700
Elastic webbing	111	310,800	247	691,600
Clothing and articles for travel	14	44,800	2	6,400
Manufactures of india rubber and gutta percha, n. e. s.:				
From cut sheets	19	53,200	19	53,200
Elastic fabrics	849	1,443,300	2,080	3,536,000
Tires and tubes:				
From France	1,448		2,729	
Great Britain	410	4,459,200	461	7,663,200
Other countries	.....		3	
Other rubber manufactures:				
From France	1,286		90	
Great Britain	1,015	3,943,500	7,799	11,866,500
United States	126		22	
Other countries	2		.....	
Totals manufactured	.....	11,653,140	.....	25,582,000
Total imports	.....	48,936,540	.....	94,401,670

EXPORTS OF CRUDE AND MANUFACTURED RUBBER.

	Six Months Ended June 30. 1918. Quintals.[1]	1918. Lire.[2]	1919. Quintals.	1919. Lire.
UNMANUFACTURED—				
India rubber and gutta percha—raw and reclaimed:				
To Spain	585	280,000	1,922	1,316,800
United States	115		1,370	
Rubber scrap	.....	.....	100	12,000
Totals, unmanufactured	.....	280,000	.....	1,328,800
MANUFACTURED—				
India rubber and gutta percha—Threads	18	48,600	180	486,000
Sheets:				
Cut sheets	7	16,800	25	60,000
Elastic fabric	21	25,200	10	12,000
Other kinds, including hard rubber	20	30,000	14	21,000
Tubes:				
Inner tubes	3	7,800	38	98,800
Hose	86	103,200	283	339,600
Other forms	64	70,400	166	182,600
Belting	36	57,600	95	152,000
Rubber-coated fabrics—*pieces*	38	45,600	98	117,600
Elastic webbing	481	1,443,000	363	1,089,000
Clothing and articles for travel	3	14,400	4	19,200
Manufactures of india rubber and gutta percha, n. e. s.:				
From cut sheets	45	117,000	50	130,000
Elastic fabrics	64	102,400	99	158,400
Tires and tubes:				
To France	370		225	
Great Britain	1,098		1,664	
Spain	81		261	
Switzerland	.....		13	
British Indies and Ceylon	.....	5,076,800	545	11,534,900
Dutch East Indies	441		.....	
Straits Settlements	.....		140	
Australia	.....		242	
Brazil	434		462	
Other countries	244		1,904	
Other rubber manufactures:				
To France	91		166	
Great Britain	87		84	
Spain	7		8	
Switzerland	109		52	
Egypt	21	599,200	28	1,107,400
Argentina	31		95	
Brazil	17		20	
Uruguay	8		7	
Other countries	56		331	
Totals, manufactured	.....	7,758,000	.....	15,508,500
Total exports	.....	8,038,000	.....	16,837,300

[1]One quintal equals 220.46 pounds.
[2]One lira equals $0.193.

UNITED KINGDOM RUBBER STATISTICS.

IMPORTS.

	October. 1918. Pounds.	1918. Value.	1919. Pounds.	1919. Value.
UNMANUFACTURED—				
Crude rubber:				
From—				
Dutch East Indies	200,000	£24,181	1,824,100	£186,612
French West Africa	.....	.....	.....	.....
Gold Coast	.....	.....	9,400	607
Other African countries	368,800	36,565	141,900	12,008
Peru	.....	.....	111,400	11,040
Brazil	76,600	10,398	437,500	44,823
British India	35,800	4,189	253,100	25,178
Straits Settlements and dependencies, including Labuan	774,400	81,958	7,831,900	809,345
Federated Malay States	425,600	50,288	9,999,400	1,009,367
Ceylon dependencies	2,296,700	264,211	1,537,000	160,225
Other countries	104,200	10,691	762,300	75,745
Totals	4,282,200	£482,581	22,908,000	£2,334,950
Waste and reclaimed rubber	3,600	32	680,400	21,271
Totals, unmanufactured	4,285,800	£482,613	23,597,400	£2,356,221
Gutta percha	997,600	186,189	1,442,300	290,895
MANUFACTURED—				
Boots and shoes—*dozen pairs*	1,480	£6,690	20,805	£33,731
Waterproofed clothing	.....	.....	.....	3,506
Automobile tires and tubes	.....	70,530	.....	199,119
Motorcycle tires and tubes	.....	16	.....	145
Carriage tires and tubes	.....	.....	.....	.....
Bicycle tires and tubes	.....	.....	.....	9,032
Insulated wire	.....	1,538	.....	381
Submarine cables	.....	.....	.....	38
Totals	.....	£78,774	.....	£245,952

EXPORTS.

UNMANUFACTURED—				
Waste and reclaimed rubber	249,200	£6,917	1,120,900	£26,401
MANUFACTURED—				
Waterproofed clothing	.....	36,968	.....	189,365
Boots and shoes—*dozen pairs*	5,945	9,218	14,981	32,736
Insulated wire	.....	5,473	.....	81,709
Submarine cables	.....	2,146	.....	46,292
Carriage tires and tubes	.....	15,228	.....	24,027
Automobile tires and tubes	.....	137,525	.....	164,794
Motorcycle tires and tubes	.....	10,291	.....	17,309
Other rubber manufactures	.....	117,723	.....	228,289
Totals	.....	£363,961	.....	£905,060

EXPORTS—COLONIAL AND FOREIGN.

UNMANUFACTURED—				
Crude rubber:				
To Belgium	.....	.....	498,400	£48,141
France	1,940,400	£226,706	1,638,900	175,095
Italy	401,700	36,024	214,800	23,652
United States	.....	.....	16,131,200	1,687,931
Other countries	179,600	27,117	3,513,500	361,285
Totals	2,521,700	£289,847	22,046,800	£2,296,104
Waste and reclaimed rubber	.....	.....	14,000	700
Totals, unmanufactured	2,521,700	£289,847	22,060,800	£2,296,804
Gutta percha	2,100	£428	61,300	£11,759

UNITED KINGDOM RUBBER STATISTICS—(Continued)

October.

	1918. Pounds.	1918. Value.	1919. Pounds.	1919. Value.
MANUFACTURED—				
Boots and shoes..*dozen pairs*	.....	.....	90	449
Waterproof clothing	.....	.....	.....	5
Insulated wire	.....	.....	.....	975
Automobile tires and tubes..	.....	10	.....	8,372
Motorcycle tires and tubes....	.....	26	.....	.....
Bicycle tires and tubes.....	.....	.....	.....	234
Carriage tires and tubes.....	.....	.....	.....	.....
Totals	.....	£36	.....	£10,035

RUBBER STATISTICS FOR THE DOMINION OF CANADA.

IMPORTS OF CRUDE AND MANUFACTURED RUBBER.

September.

	1918. Pounds.	1918. Value.	1919. Pounds.	1919. Value.
UNMANUFACTURED—*free:*				
Rubber, gutta percha, etc.:				
From United Kingdom....	130,136	$53,538	850,491	$374,266
United States.....	142,456	59,453	468,858	194,954
British East Indies:				
Ceylon	112,050	47,561	30,651	17,098
India	19,860	8,692	.....	.....
Straits Settlements	1,860,969	683,990	609,540	264,217
Other countries.....	22,879	7,693	.....	.....
Totals	2,288,850	$860,927	1,959,540	$850,535
Rubber, recovered	194,777	$32,898	180,642	$28,902
Hard rubber sheets and rods	2,647	1,828	5,977	4,493
Hard rubber tubes.....	.....	826	.....	3,211
Rubber, powdered, and rubber or gutta percha scrap.....	93,362	6,079	220,572	16,498
Rubber thread, not covered..	1,846	2,674	3,469	5,080
Rubber substitute	62,882	10,118	53,260	9,255
Totals	355,514	$54,514	466,920	$67,439
Chicle	49,507	30,469	118,334	93,790
MANUFACTURED—*dutiable:*				
Boots and shoes.....	.....	$32,562	.....	$40,106
Waterproofed clothing.....	.....	7,473	.....	14,629
Belting, hose, packing, and matting	.....	32,514	.....	24,194
Gloves and hot-water bottles.	.....	(*)	.....	5,962
Tires	.....	65,288	.....	128,485
Other manufactures	.....	106,817	.....	167,308
Totals	.....	$244,654	.....	$380,684

EXPORTS OF DOMESTIC AND FOREIGN RUBBER GOODS.

September

	1918. Produce of Canada. Value.	1918. Reexports of Foreign Goods. Value.	1919. Produce of Canada. Value.	1919. Reexports of Foreign Goods. Value.
UNMANUFACTURED—				
Crude and waste rubber.....	.....	.....	$52,653	$11,062
MANUFACTURED—				
Hose	$24,081	.....	17,983	.....
Boots and shoes.....	155,123	.....	175,533	593
Clothing	3,259	.....	2,413	13
Belting	110	.....	14,016	.....
Tires	93,590	$1,402	456,834	1,486
All other, n. o. p.....	9,614	338	17,549	1,113
Totals	$285,777	$1,740	$737,081	$14,267
Chicle	.....	.....	$1,941	.....

* Included in "Other manufactures."

THE MARKET FOR RUBBER SCRAP.

NEW YORK.

THE RUBBER SCRAP MARKET continues inactive. There is only moderate demand for stock on the part of the reclaiming industry and a marked tendency to hold off in purchases until after the usual inventory period is passed.

The prices for shoes are steady without movement of the goods.

The same is true of automobile tires, which are sought actively only on the part of tire rebuilding concerns and those preparing pulled fabric for manufacturers of tire reliners, tire boots and tire repair men for patching purposes.

Dealers view with some concern the London prediction that the output of crude rubber for 1920 will be much increased over that of the past year, in anticipation that such a condition will influence unfavorably the demand for reclaim and consequently for scrap.

QUOTATIONS FOR CARLOAD LOTS DELIVERED.

DECEMBER 29, 1919.

Prices subject to change without notice.

BOOTS AND SHOES:			
Arctic tops	*lb.*	$0.01 @	
Boots and shoes	*lb.*	.08½ @	.08½
Trimmed arctics	*lb.*	.06½ @	.06½
Untrimmed arctics	*lb.*	.05½ @	
HARD RUBBER:			
Battery jars, black compound	*lb.*	.01 @	
No. 1, bright fracture	*lb.*	.23 @	.24
INNER TUBES:			
No. 1, old packing	*lb.*	.18½ @	.19¼
No. 2	*lb.*	.10 @	.10¼
Red	*lb.*	.09½ @	.09¾
MECHANICALS:			
Black scrap, mixed, No. 1	*lb.*	.03½ @	.04
No. 2	*lb.*	.03 @	
Car springs	*lb.*	.03½ @	.04
Heels	*lb.*	.03 @	.03½
Horse-shoe pads	*lb.*	.03 @	.03½
Hose, air brake	*lb.*	.04¼ @	
fire, cotton lined	*lb.*	.01½ @	.01¾
garden	*lb.*	.01½ @	.01¾
Insulated wire stripping, free from fiber	*lb.*	.03½ @	.04
Matting	*lb.*	.01¼ @	.01½
Red packing	*lb.*	.05½ @	.06
Red scrap, No. 1	*lb.*	.09 @	.10
No. 2	*lb.*	.06¾ @	.07¼
White scrap No. 2	*lb.*	.08 @	.09
No. 1	*lb.*	.10 @	.11
TIRES:			
PNEUMATIC—			
Auto peelings, No. 1	*lb.*	.06¾ @	.07¾
No. 2	*lb.*	.04¾ @	.05¼
Bicycle	*lb.*	.02¾ @	.03
Standard white auto	*lb.*	.03½ @	.03¾
Standard mixed auto	*lb.*	.03¾ @	
Stripped, unguaranteed	*lb.*	.02¾ @	
White, G. & G., M. & W., and U. S.	*lb.*	.04¾ @	.05
SOLID—			
Carriage	*lb.*	.04 @	.04¼
Irony	*lb.*	.01 @	
Truck	*lb.*	.03½ @	.03¾

THE MARKET FOR COTTON AND OTHER FABRICS.

NEW YORK.

AMERICAN COTTON. On December 1, the spot price for middling uplands cotton stood at 39.45 cents; it fluctuated above that price for a week or so, reaching 40.25 cents, the high mark for the month, then dropped to 38 cents, where it stayed for a few days. December 17 saw it rise again to 39.25, a price which was maintained for fully two weeks to the end of the year, without change and with a daily record of "no sales."

EGYPTIAN COTTON. The market dropped sharply from the high prices reached at the beginning of November and is now quiet but strong. No upper Egyptian is left and low-grade Sakellarides is also scarce so that purchases of Egyptian, practically, will be limited to medium and high-grade Sakellarides, which are quoted at 85 to 90 cents.

AMERICAN-EGYPTIAN COTTON. Arizona cotton also dropped in sympathy with Egyptian. Early frosts followed by rain stopped growth so that the cotton was coming in ranks only as choice. The crop estimate is much reduced and 40,000 bales may be too high. Arizona-Egyptian is quoted at 80 to 85 cents.

SEA ISLAND COTTON. The situation is unchanged. Very little high-grade exists, buying though steady is slow and the price quoted for average extra choice is 84 cents.

TIRE FABRICS. The manufacturers of tire fabrics are working hard to meet the demands of the customers with whom they have made contracts. It is useless to quote prices because fabrics are not to be had save possibly for an occasional small lot.

DUCKS AND DRILLS. Owing to the continued labor troubles, there is a scarcity of supply which cannot be remedied, however keen the demand, until the mill hands settle down to working full time again. The inactivity of the mills has checked the need for some lines of goods, such as belting duck, and dealers are awaiting the return of normal conditions.

NEW YORK QUOTATIONS.

DECEMBER, 29, 1919.

Prices subject to change without notice.

ASBESTOS CLOTH:

Brake lining, 2½ lbs. sq. yd., brass or copper insertion	*lb.*	$1.00	@ 1.10
2¾ lbs. sq. yd., brass or copper insertion	*lb.*	1.10	@ 1.15

BURLAPS:

32—7-ounce	*100 yards*	11.00 @
32—8-ounce		11.75 @
40—7½-ounce		12.15 @
40—8-ounce		12.25 @
40—10-ounce		17.00 @
40—10½-ounce		17.25 @
45—7½-ounce		15.50 @
45—8-ounce		20.00 @

DRILLS:

38-inch 2.00-yard	*yard*	.42½ @
40-inch 2.47-yard		.34½ @
52-inch 1.90-yard		.60½ @
52-inch 1.95-yard		.59 @
60-inch 1.52-yard		.85½ @

DUCK:

CARRIAGE CLOTH:

38-inch 2.00-yard enameling duck	*yard*	.43½ @
38-inch 1.74-yard		.49½ @
72-inch 16.66-ounce		1.14½ @
72-inch 17.21-ounce		1.18¾ @

MECHANICAL:

Hose	*pound*	.70 @
Belting		.72 @

HOLLANDS, 40-INCH:

Acme	*yard*	.*30 @
Endurance		* .38 @
Penn		* .46 @

OSNABURGS:

40-inch 2.35-yard	*yard*	.35⅛ @
40-inch 2.48-yard		.33⅝ @
37½-inch 2.42-yard		.34¾ @

RAINCOAT FABRICS:

COTTON:

Bombazine 64 x 60 water-repellent	*yard*	.26 @	
60 x 48 not water-repellent		.23 @	
Cashmeres, cotton and wool, 36-inch, tan		1.10 @	
Twills 64 x 72		.46 @	
64 x 102		.48 @	
Twill, mercerized, 36-inch, blue and black		.65 @	
tan and olive		.62½ @	
Tweed		.90 @	1.00
printed		.27½ @	
Plaids 60 x 48		.24 @	
56 x 44		.23 @	
Repp		.45 @	.50
Surface prints 60 x 48		.25 @	
64 x 60		.27 @	

IMPORTED WOOLEN FABRICS SPECIALLY PREPARED FOR RUBBERIZING—PLAIN AND FANCIES:

63-inch, 3¼ to 7½ ounces	*yard*	1.30 @	3.75
36-inch, 2¾ to 5 ounces		.75 @	2.15

IMPORTED PLAID LINING (UNION AND COTTON):

63-inch, 2 to 4 ounces	*yard*	.95 @	1.90
36-inch, 2 to 4 ounces		.60 @	1.15

DOMESTIC WORSTED FABRICS:

36-inch, 4½ to 8 ounces	*yard*	.75 @	1.75

DOMESTIC WOVEN PLAID LININGS (COTTON):

36-inch, 3¾ to 5 ounces		.25 @	.35

SHEETINGS:

48 x 48-inch, 2.35-yard	*yard*	.34 @
48 x 48-inch, 2.50-yard		.32 @
48 x 48-inch, 2.70-yard		.30 @
48 x 48-inch, 2.85-yard		.28½ @
64 x 68-inch, 3.15-yard		.32¼ @
56 x 60-inch, 3.60-yard		.27 @

JACKET:

Delaware	*yard* *	.30 @
Schuykill	*yard* *	.37 @

SILKS:

Canton, 38-inch	*yard*	.72½ @
Schappe, 36-inch		1.00 @

TIRE FABRICS:

BUILDING:

17¼-ounce Sea Island, combed	*pound*	2.25 @
17¼-ounce Egyptian, combed		2.00 @
17¼-ounce Egyptian, carded		1.80 @
17¼-ounce, Peelers, combed		2.25 @
17¼-ounce Peelers, carded		1.30 @

CHAFER:

9¼ ounce Sea Island		2.75 @
9¼-ounce Egyptian, carded		2.25 @
9¼-ounce peeler, carded		1.40 @

*Nominal.

ANNUAL STATEMENT OF THE EGYPTIAN COTTON CROP.

	Season. 1918-1919.	1917-1918.	1916-1917
Total receipts (interior gross weight), cantars[1]	4,826,342	6,315,841	5,126,199
EXPORTS.			
To Liverpool *bales*	254,509	225,253	211,618
Manchester	148,415	120,715	134,358
Other United Kingdom ports	6,019	147,327	.....
Total shipments to Great Britain	408,943	493,295	345,976
To France	56,250	32,566	29,302
Spain	16,305	9,571	11,391
Italy	44,233	40,693	33,493
Switzerland	22,423	8,917	20,673
Russia	.....	.....	33,031
Greece	4,513	2,862	110
Total shipments to Continent	143,724	94,609	128,000
To United States	78,454	76,640	135,685
India	.....	.....	100
Japan	24,017	20,617	14,378
Total to all parts	655,138	685,161	624,139
Equal to cantars (interior gross weight)	4,948,544	5,235,935	4,765,549

SUPPLY, EXPORTS AND STOCK.

	Season.		
	1918-1919	1917-1918	1916-1917
Stock beginning of season.....*cantars*	1,423,000	405,000	109,000
Total crop	4,826,342	6,315,841	5,126,199
Total supply	6,249,342	6,720,841	5,235,199
Exported 4,948,544			
Local consumption 56,758			
Burnt 1,040			
	5,006,342	5,297,841	4,830,199
Leaving stock in Alexandria end of season	1,243,000	1,423,000	405,000

Average gross weight of Bales exported.	Bales.	Average Cantars.	Bales.	Average Cantars.	Bales.	Average Cantars.
To Great Britain.....	408,943	....	493,295	7.676	345,976	7.642
United States.....	78,454	....	76,640	7.624	135,685	7.669
Continent and Japan	167,741	....	115,226	7.507	142,478	7.588
Average of total exports	655,138	7.554	685,161	7.642	624,139	7,635

TOTAL CROPS (Interior gross weight).

Season.	Area in Feddans.	Cantars.	Yield in Cantars per Feddan.
1898-99	1,121,261	5,589,314	4.98
1899-1900	1,153,306	6,510,050	5.64
1900-01	1,230,320	5,427,338	4.41
1901-02	1,249,884	6,371,643	5.09
1902-03	1,275,680	5,838,090	4.57
1903-04	1,332,510	6,508,947	4.88
1904-05	1,436,708	6,351,879	4.42
1905-06	1,566,601	5,959,883	3.80
1906-07	1,506,290	6,949,783	4.61
1907-08	1,603,224	7,234,669	4.51
1908-09	1,640,415	6,755,812	4.12
1909-10	1,466,530	4,986,715	3.40
1910-11	1,603,226	7,573,537	4.72
1911-12	1,711,237	7,424,208	4.34
1912-13	1,721,797	7,532,920	4.38
1913-14	1,723,094	7,684,172	4.46
1914-15	1,755,270	6,463,726	3.68
1915-16	1,186,004	4,726,518	3.99
1916-17	1,655,512	5,126,199	3.10
1917-18	1,677,308	6,315,841	3.77
1918-19	1,315,572	4,826,342	3.67

The figures of the area sown are supplied by the Egyptian Ministry of Finance.

ACREAGE PLANTED TO VARIOUS VARIETIES OF EGYPTIAN COTTON.

	Season.		
	1919.	1918.	1917.
Afifi Assil .....*feddans*	21,003	20,736	38,008
Mit Afifi	35,145	36,242	96,674
Abbassi	3,718	4,869	3,489
Jannovitz	97	223	1,592
Ashmouni	334,160	273,936	361,875
Nubari	23,611	21,587	39,337
Sakellarides	1,146,443	952,480	1,133,180
Various	9,485	5,499	3,153
Totals .....*feddans*	1,573,662	1,315,572	1,677,308

One cantar equals 98 pounds.
One feddan equals 1.1 acres.
(*Compiled by Davies, Benachi & Co.*)

THE MARKET FOR CHEMICALS AND COMPOUNDING INGREDIENTS.

NEW YORK.

THERE IS GENERALLY a short supply of all leading rubber compounding ingredients. The market is firm and there appears to be no prospect of lower prices after the first of the year. Everything, on the contrary, tends to higher manufacturing costs. In some directions there is curtailment of production and limited supplies regardless of prices.

ANILINE OIL. There is no spot stock and prices have advanced.

BARYTES. Prices are very firm because of the inability to get stocks forward and the danger of the short coal supply as well as the continued lack of labor.

BENZOL. The demand is very active with 34 cents the price for spot goods.

LITHARGE. The price has advanced a cent during the past month, but the demand continues to far exceed the producing capacity of the makers.

LITHOPONE. Contracts for the early months of 1920 have been placed at 7 to 7½ cents. Prices are exceedingly firm.

LIME. Makers report that they are several hundred tons behind in production and have found it necessary to discard certain productions of lime in order to take care of the heavy orders on the more essential grades.

SUBLIMED LEAD. In spite of the heavy and increasing demand prices have not been advanced.

SULPHUR. The market is firm and steady and prices reasonable.

WHITING. Owing to the difficulties of securing adequate supplies of English chalk the situation was relieved somewhat during December by arrival of chalk from Danish sources. Supplies are still short owing to slow arrivals of material.

NEW YORK QUOTATIONS.

DECEMBER 29, 1919.

Prices subject to change without notice.

ACCELERATORS, ORGANIC.			
Accelerator, N. C. C.	*lb.*	$0.50 @	
Accelerene, New York	*lb.*	4.75 @	
Accelemal	*lb.*	.55 @	.57½
Aldehyde ammonia crystals	*lb.*	1.35 @	1.50
Aniline oil	*lb.*	.33 @	.35
Excellerex	*lb.*	.65 @	.75
Hexamethylene tetramine (powdered)	*lb.*	1.40 @	1.60
Paraphenylenediamine	*lb.*	2.40 @	
Thiocarbanilide	*lb.*	.55 @	.75
ACCELERATORS, INORGANIC.			
Lead, dry red (bbls.)	*lb.*	.10¾ @	
sublimed blue (bbls.)	*lb.*	.08¼ @	
sublimed white (bbls.)	*lb.*	.08¼ @	
white, basic carbonate (bbls.)	*lb.*	.09 @	
Lime, flour	*lb.*	.01¼ @	.02½
Litharge, domestic	*lb.*	.09¾ @	.10¼
sublimed	*lb.*	.10½ @	
imported	*lb.*	.14 @	.15
Magnesium, carbonate	*lb.*	.12½ @	
calcined heavy (Thistle)	*lb.*	.11 @	
light (Manhattan)	*lb.*	.35 @	
Magnesium oxide	*lb.*	.65 @	
Magnesite, calcined	*ton*	50.00	@65.00
ACIDS.			
Acetic, 28 per cent (bbls.)	*lb.*	.03 @	
glacial, 99 per cent (carboys)	*lb.*	.12½ @	
Creasylic (97% straw color)	*gal.*	.77 @	.80
(95% dark)	*gal.*	.72 @	.75
Muriatic, 20 degrees	*cwt.*	1.75 @	2.00
Nitric, 36 degrees	*lb.*	.06 @	.06½
Sulphuric, 66 degrees	*ton*	20.00 @	
ALKALIES.			
Caustic soda, 76 per cent (bbls.)	*lb.*	.05 @	
Soda ash (bbls.)	*lb.*	.03½ @	
COLORS.			
Black:			
Bone, powdered	*lb.*	.05 @	
granulated	*lb.*	.09 @	
Carbon black (sacks, factory)	*lb.*	.13 @	
Drop	*lb.*	.06 @	.13
Ivory black	*lb.*	.16 @	.30
Lamplack	*lb.*	.13 @	
Oil soluble aniline	*lb.*	1.25 @	
Rubber black	*lb.*	.08½ @	
Blue:			
Cobalt	*lb.*	.25 @	.35
Prussian	*lb.*	.85 @	.90
Ultramarine	*lb.*	.18 @	.40
Brown:			
Iron oxide	*lb.*	.03 @	.03½
Sienna, Italian, raw and burnt	*lb.*	.05¾ @	.15
Umber, Turkey, raw and burnt	*lb.*	.05 @	.07
Vandyke	*lb.*	.02½ @	.03½
Green:			
Chrome, light	*lb.*	.37 @	.50
medium	*lb.*	.40 @	.50
dark	*lb.*	.50 @	
commercial	*lb.*	.14 @	
Oxide of chromium (casks)	*lb.*	.60 @	1.25
Red:			
Antimony, crimson, sulphuret of (casks)	*lb.*	.40 @	
Antimony, golden sulphuret of (casks)	*lb.*	.35 @	
golden sulphuret (States)	*lb.*	.30 @	
red sulphuret (States)	*lb.*	.25 @	
vermilion sulphuret	*lb.*	.55 @	
Arsenic, red sulphide	*lb.*	.20 @	
Indian	*lb.*	.08½ @	.14
Toluidine toner	*lb.*	4.00 @	
Iron oxide, reduced grades	*lb.*	.12 @	
pure bright	*lb.*	.16 @	
Spanish	*lb.*	.03½ @	
Venetian	*lb.*	.02½ @	.05
Oil soluble aniline, red	*lb.*	2.00 @	
orange	*lb.*	1.75 @	
Oximony	*lb.*	.18 @	

Vermilion, English, pale, medium, dark	lb.	1.55	@
artificial	lb.	.35	@
English quicksilver	lb.	1.60	@ 1.70
White:			
Aluminum bronze, C. P.	lb.	.55	@
superior	lb.	.60	@
Lithopone, domestic	lb.	.07	@ .07¾
Ponolith (carloads, factory)	lb.	*.07	@ .07¼
Rubber-makers' white	lb.	*.06½	@ .06¾
Zinc oxide, Horsehead (less carload, factory):			
"XX red"	lb.	.09	@ .10½
"Special"	lb.	.09½	@ .09¾
French process, red seal	lb.	.09½	@ .11
green seal	lb.	.10½	@ .12
white seal	lb.	.11½	@ .13
(States)	lb.	.08¾	@
Azo, ZZZ, lead free (less carload factory)	lb.	.09¼	@
ZZ, under 5% leaded (less carload factory)	lb.	.08¾	@
Z, 8-10% leaded (less carload factory	lb.	.08¼	@
Yellow:			
Cadmium, sulphide, yellow, light, orange	lb.	2.00	@
red	lb.	1.85	@
Chrome, light and medium	lb.	.26	@
Ochre, domestic	lb.	.03	@ .07
imported	lb.	.05	@ .07
Oil, soluble aniline	lb.	2.00	@
Zinc chromate	lb.	.40	@

COMPOUNDING INGREDIENTS.

Aluminum flake	ton		@
Aluminum oxide	lb.	*.18	@
Ammonia carbonate, powdered	lb.	.12¼	@ .13
Asbestine (carloads)	ton	*25.00	@
Asbestos (bags)	ton	*35.00	@
Avoilas compound	lb.	.33	@
Barium, carbonate, precipitated	ton	80.00	@
sulphide, precipitated	lb.	.08½	@
dust	ton	90.00	@
Barytes, pure white	ton	32.50	@40.00
Barytes, off color	ton	22.50	@25.00
uniform floated	ton	40.00	@
Basofor	lb.	.05	@
Blanc fixe	lb.	.04½	@
Bone ash	lb.	.06	@
Chalk, precipitated, extra light	lb.	.05	@ .05½
heavy	lb.	.04	@ .04½
China clay, domestic	ton	8.50	@20.00
imported	ton	18.00	@23.50
Shawnee	ton	15.00	@
Cork flour	lb.	.53	@
Cotton linters, clean mill run, f. o. b. factory	lb.	.04	@
Fossil flour (powdered)	ton	60.00	@
(bolted)	ton	65.00	@
Diatomite	lb.	.02½	@
Glue, high grade	lb.	.35	@ .40
medium	lb.	.15	@ .19
low grade	lb.	.11	@ .14
Graphite, flake (400-pound bbl.)	lb.	.10	@ .30
amorphous	lb.	.04	@ .08
Ground glass FF. (bbls.)	lb.	.03	@
Infusorial earth (powdered)	ton	60.00	@
(bolted)	ton	65.00	@
Liquid rubber	lb.	16½	@
Mica, powdered	lb.	.07½	@ .08
Fumice stone, powdered (bbl.)	lb.	.05	@
Rotten stone, powdered	lb.	.02½	@ .04½
Rub-R-Glu	lb.	*.20	@ .25
Silex (silica)	ton	22.00	@40.00
Starch, powdered corn (carload, bbls.)	cwt.	5.34	@
(carload, bags)	cwt.	5.12	@
Talc, powdered soapstone	ton	18.50	@22.00
Tripoli earth, air-floated	ton	35.00	@40.00
Tyre-lith	ton	90.00	@
Whiting, Alba (carloads)	cwt.	.80	@ .90
Columbia	cwt.	.80	@
commercial	cwt.	1.15	@ 1.20
English cliffstone	cwt.	1.75	@ 2.50
gilders	cwt.	1.35	@
Paris, white, American	cwt.	1.75	@
Quaker	ton	15.00	@
Wood pulp, imported	lb.	.03½	@
Wood flour, American	ton	40.00	@45.00

MINERAL RUBBER.

Gilsonite	ton	57.50	@60.00
Genasco (carloads, factory)	ton	55.00	@
(less carloads, factory)	ton	57.00	@
Hard hydrocarbon	ton	30.00	@65.00
K-X	ton	110.00	@
K. M. R.	ton	*40.00	@60.00
M. R. X.	ton	100.00	@
Pioneer, carload, factory	ton	55.00	@
less carload, factory	ton	57.00	@
Raven M. R.	ton	.50	@ .70
Refined Elaterite	ton	175.00	@
Richmond	ton	75.00	@
No. 64	ton	44.00	@
318/320 M. P. hydrocarbon	ton	50.00	@
Robertson, M. R. Special (carloads, factory)	ton	80.00	@
M. R. (carloads, factory)	ton	55.00	@60.00
Walpole rubber flux (factory)	lb.	.05	@

OILS.

Castor, No. 1, U. S. P.	lb.	.20	@
No. 3, U. S. P.	lb.	.19	@
Corn, refined Argo	cwt.	23.56	@
Cotton	lb.	.21	@
Glycerine (98 per cent)	lb.	.21	@
Glycerole	lb.	.55	@
Linseed, raw (carloads)	gal.	1.92	@
Linseed compound	gal.	.85	@
Palm (Niger)	lb.	.16½	@
Peanut	lb.	.25	@
Petrolatum	lb.	.07	@
Petroleum grease	lb.	.04¼	@
Pine, steam distilled	gal.	1.30	@
Rapeseed, refined	gal.	1.65	@
blown	lb.	.21½	@
Rosin	bbl.	18.25	@
Soya bean	lb.	.18½	@
Tar	gal.	.30	@ .40

RESINS AND PITCHES.

Cantella gum	lb.	.55	@
Tar, retort	bbl.	15.25	@16.00
kiln	bbl.	15.00	@
Pitch, Burgundy	lb.	.08½	@
coal tar	bbl.	7.50	@
pine tar	lb.	.04	@
ponto	lb.	.14	@
Rosin	bbl.	None	
granulated	lb.	None	
fused		None	
Rosin, K	bbl.	20.50	@
Shellac, fine orange	lb.	1.45	@

SOLVENTS.

Acetone (98.99 per cent drums)	lb.	.17	@
methyl (drums)	gal.	1.15	@
Benzol, water white	gal.	.27	@ .31
Beta-naphthol, resublimed	lb.	1.00	@
ordinary grade	lb.	.55	@
Carbon bisulphide (drums)	lb.	.05½	@ .06¼
tetrachloride (drums)	lb.	.11	@ .13
Naphtha, motor gasoline (steel bbls)	gal.	.24½	@
73 @ 76 degrees (steel bbls.)	gal.	None	
68 @ 70 degrees (steel bbls.)	gal.	None	
Solvent	gal.	.20	@
V. M. & P. (steel bbls.)	gal.	.23½	@
Toluol, pure	gal.	.28	@ .32
Turpentine, spirits	gal.	1.67	@
wood	gal.	1.65	@
Osmaco reducer	gal.	.30	@
Xylol, pure	gal.	.35	@ .45
commercial	gal.	.30	@ .35

SUBSTITUTES.

Black	lb.	.10½	@ .21
White	lb.	.11	@ .23
Brown	lb.	.15	@ .22
Brown factice	lb.	.09½	@ .22
White factice	lb.	.11	@ .23
Paragol, soft and medium (carloads)	cwt.	18.58	@
hard	cwt.	18.08	@

VULCANIZING INGREDIENTS.

Lead, black hyposulphite (Black Hypo)	lb.	.52	@ .56
Orange mineral, domestic	lb.	.13¼	@
Sulphur chloride (drums)	lb.	.06½	@ .07
Sulphur, flour, Brooklyn brand (carloads)	cwt.	3.15	@
pure soft (carloads)	cwt.	3.40	@
superfine (carloads, factory)	lb.	.02½	@

(See also Colors—Antimony.)

WAXES.

Wax, beeswax, white	lb.	.67	@ .68
ceresin, white	lb.	.16½	@ .18½
carnauba	lb.	.47	@ .85
ozokerite, black	lb.	.60	@ .70
green	lb.	.85	@ .87
Montan	lb.	.28	@ .30
substitute	lb.	None	
paraffine, refined 118/120 m. p. (cases)	lb.	.09½	@
123/125 m. p. (cases)	lb.	.09¾	@
128/130 m. p. (cases)	lb.	.10¼	@

*Nominal.

PAN AMERICAN SOCIETY DINNER.

The Secretary of the Treasury as president of the United States section of the International High Commission has accepted the offer of the Pan American Society to give a dinner in New York to the foreign delegates to the Second Pan American Financial Conference.

This dinner, which will conclude the official program of the conference, will take place at the Waldorf-Astoria at 7 p. m., Monday, January 27, 1920. Prominent rubber men on the dinner committee include E. H. Huxley, William S. Kies and Frank A. Vanderlip.

INDIA RUBBER WORLD
FOUNDED 1889

Vol. 61 JANUARY 1, 1920. No. 4

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